TECHNOLOGY DEPT.

FLIGHT

MAGAZINE

MARCH 1954
35 cents

Fd 41 #3

BEECHCRAFT B50 TWIN-BONANZA

STRATOS COOLS THE DOUGLAS X-3

MAJOR COMPONENTS X-3 COOLING SYSTEM
BLOWER HEAT EXCHANGER
RAM AIR HEAT EXCHANGER
100 LB/MIN AIR CYCLE REFRIGERATION TURBINE
WATER EVAPORATOR

For cooling the Douglas X-3, Stratos built the highest capacity airborne refrigeration system ever made and designed it to meet the severest requirements yet imposed by high speed flight. It is the first to use an evaporator in conjunction with an air cycle refrigeration turbine to create a compact, reliable system.

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Stratos is proud to have been called on to design and produce equipment for this radical new research airplane built under the joint sponsorship of the Air Force, the National Advisory Committee for Aeronautics and the Navy.

PRINCIPAL STRATOS PRODUCTS: *Jet Bleed Refrigeration Packages • Air Turbine Drives • Pneumatic Controls • Air-Moisture Separators • Cabin Superchargers • Bootstrap Refrigeration Units Mass Flow Valves • Emergency Disconnects*

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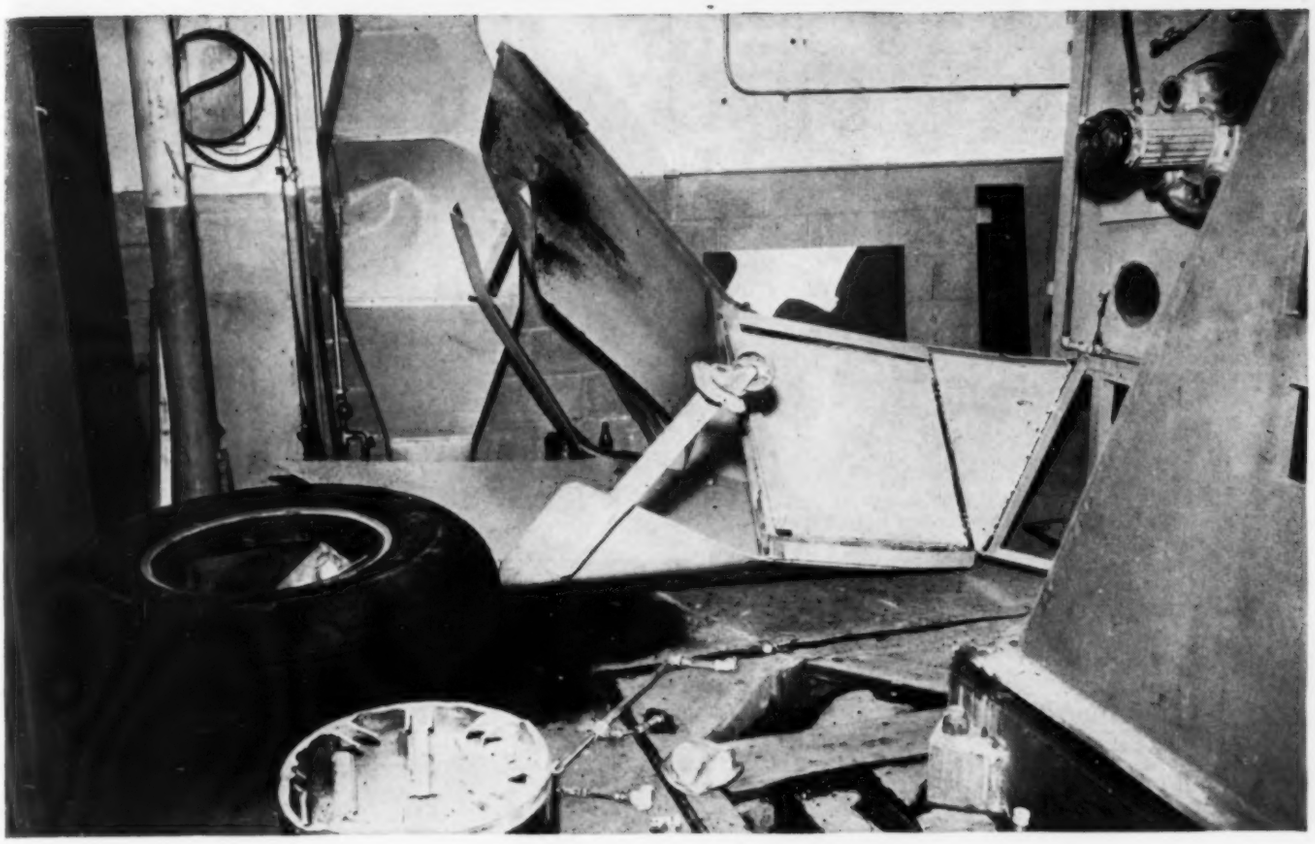

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—in forcing a failure!

HERE's the way our Roll Test Room looked after we ran a Goodyear Airplane Wheel — under service load conditions—*far beyond* the life limits demanded by rigid specifications governing the wheel's manufacture.

We ran it hour after hour, mile after mile, day after day — until it literally "exploded"—to find out just where the point of failure would be, once its tough limit of endurance was reached.

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As a result—knowing where to shave off metal, where to bolster strength — we are able to build even greater load capacity and life expectancy into each pound of airplane wheel.

Such thorough-going studies — which include the analysis of strain gauge, stress coat, load and burst tests, topped off by rigorous flight testing—have a great deal to do with the superiority of Goodyear Aviation Products.

You might wonder if this tremendous investment in test equipment, engineering talent and research has paid off.

One simple fact gives the answer: *More aircraft land on Goodyear tires, tubes, wheels and brakes than on any other kind.*

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GOODYEAR
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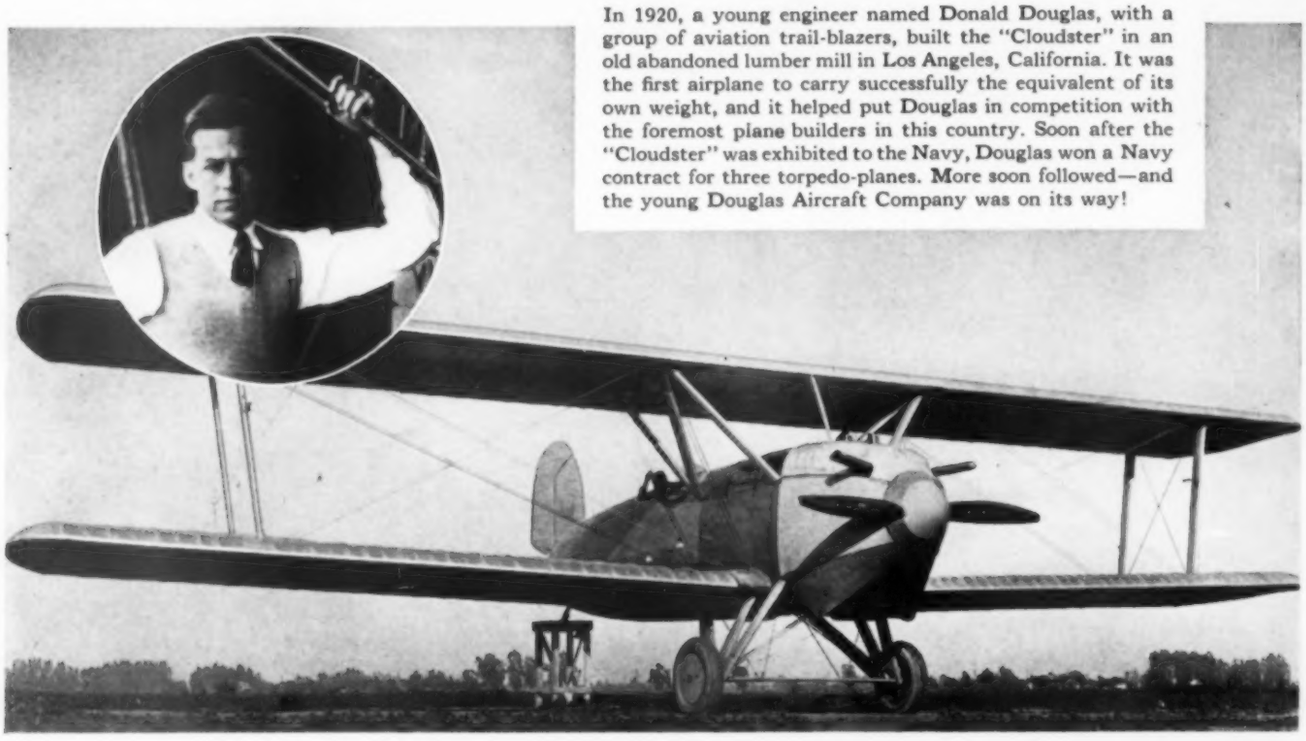
FACILITIES + ABILITIES = EXTRA *plus* IN PERFORMANCE

The Douglas "Cloudster"—1920

—the beginning of the World's Largest Aircraft Plant!



In 1920, a young engineer named Donald Douglas, with a group of aviation trail-blazers, built the "Cloudster" in an old abandoned lumber mill in Los Angeles, California. It was the first airplane to carry successfully the equivalent of its own weight, and it helped put Douglas in competition with the foremost plane builders in this country. Soon after the "Cloudster" was exhibited to the Navy, Douglas won a Navy contract for three torpedo-planes. More soon followed—and the young Douglas Aircraft Company was on its way!

No other industry has contributed more to aviation's progress than the petroleum industry. And Phillips Petroleum Company has been one of the pioneers in developing new fuels to meet aviation's ever-changing demands.

New fuels for the very latest developments in turbo-props and jets are today constantly under development in the Phillips laboratories. And Phillips also has tremendous capacity for producing 115/145 grade aviation gasoline.

For the finest aviation products specify Phillips—one of the nation's largest suppliers of aviation fuels for military as well as commercial use.

AVIATION DIVISION
PHILLIPS PETROLEUM COMPANY
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TODAY Douglas is the world's largest aircraft manufacturer! Typical of Douglas' great strides in the designing and manufacturing of planes is the Douglas C-124 Globemaster II, an all-purpose giant transport built for the U. S. Air Force. Its extreme flexibility makes it one of the most versatile cargo and troop carriers in the air today.

Phillips 66

AVIATION PRODUCTS

AIR Report

Significant Trends and News

TAYLORCRAFT HAS ANNOUNCED A NEW 225-HP. WORK PLANE having a 1,505-lb. useful load at a 3,015-lb. gross weight and equipped with a constant-speed Hartzell propeller. It is available in a chemical-dispersal version known as the "Topper" or as a cargo carrier known as the "Ranch Wagon." Performance at gross weight includes take-off in 975 ft. from sod field in no wind, 925-fpm. rate of climb and 40-mph. stall speed. Length is 24 ft. ⅛ in., span is 36 ft. 4.75 ins., and height is 7 ft. 1 in. Wing area totals 186 sq. ft., for wing loading of 16.2 lbs. per sq. ft. Power loading is 13.4 lbs. per hp.

TWIN-ENGINE PIPER APACHE NO. 2 is on a nationwide demonstration tour which began the last week in February with regional Piper sales meetings at Sarasota, Florida, and Fort Worth, Texas. Other Piper dealer meetings coinciding with the tour include Dayton, Ohio, March 9-12, Minneapolis, Minn., March 15-18 and two West Coast meetings in late March and April. Apache No. 3 recently came off the line and more of the Twins are in production.

PIPER AIRCRAFT SALES WERE UP 32 PER CENT for the first four months of Piper Aircraft's new fiscal year. This sales increase follows last year's record-breaking first quarter which was 48 per cent greater than the same 1952 period in Piper sales.

NET PROFIT OF $627,445 FOR FIRST QUARTER of Beech Aircraft Corporation's new fiscal year has been reported, equal to $1.05 per share on sales and other income totalling $21,153,855.

THE 1,000TH BEECHCRAFT MODEL D18S TWIN-ENGINE EXECUTIVE TRANSPORT has been delivered by Beech Aircraft to the Ohio Oil Co., which probably operates the world's largest fleet of executive Beechcrafts — seven Bonanzas and five Model 18's. Mike Murphy is Ohio's aviation manager and he operates five other executive planes in addition to the Beechcrafts. The planes are based at Findlay, Ohio; Houston, Casper, Shreveport and Midland.

CAA REPORTS A 900-PER CENT INCREASE IN BUSINESS FLYING SINCE 1940 in a newly-issued booklet, "The Airplane at Work for Business and Industry." CAA says 11,100 company-owned aircraft logged

(Continued on page 8)

CAA TYPE CERTIFICATION OF THE NEW TWIN-ENGINE PIPER APACHE was announced last month. The picture shows W. T. Piper congratulating his chief engineer, Walter Jamouneau (right), and assistant chief engineer, William McNary, on receipt of the certificate. Three Apaches have been completed and will be retained by Piper for demonstrations. The first commercial delivery was to be made in late February. Base price of the Apache is $32,500. —(Piper Photo.)

FLIGHT MAGAZINE

Including SOUTHERN FLIGHT and MODERN AIRPORTS

MARCH, 1954 VOL. 41, No. 3

COVER: First flight photo of the improved new Beechcraft Model B50 Twin-Bonanza, now available to commercial customers at $69,950. The 6-place B50 is powered by two Lycoming engines rated at 260 hp. each. Its 6,000-lb. gross weight includes useful load of 2,060 lbs. Cruising speed at 10,000 ft. using 65 per cent of power is 192 mph. Single-engine ceiling at gross weight is 7,000 ft. —(Beech Photo.)

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GEORGE E. HADDAWAY, Editor-Publisher; TOM ASHLEY, Managing Editor; FRED N. STONES, JR., Business Manager, P. O. Box 750 (1901 McKinney Ave.), Dallas, Texas—Telephone STerling 2125.

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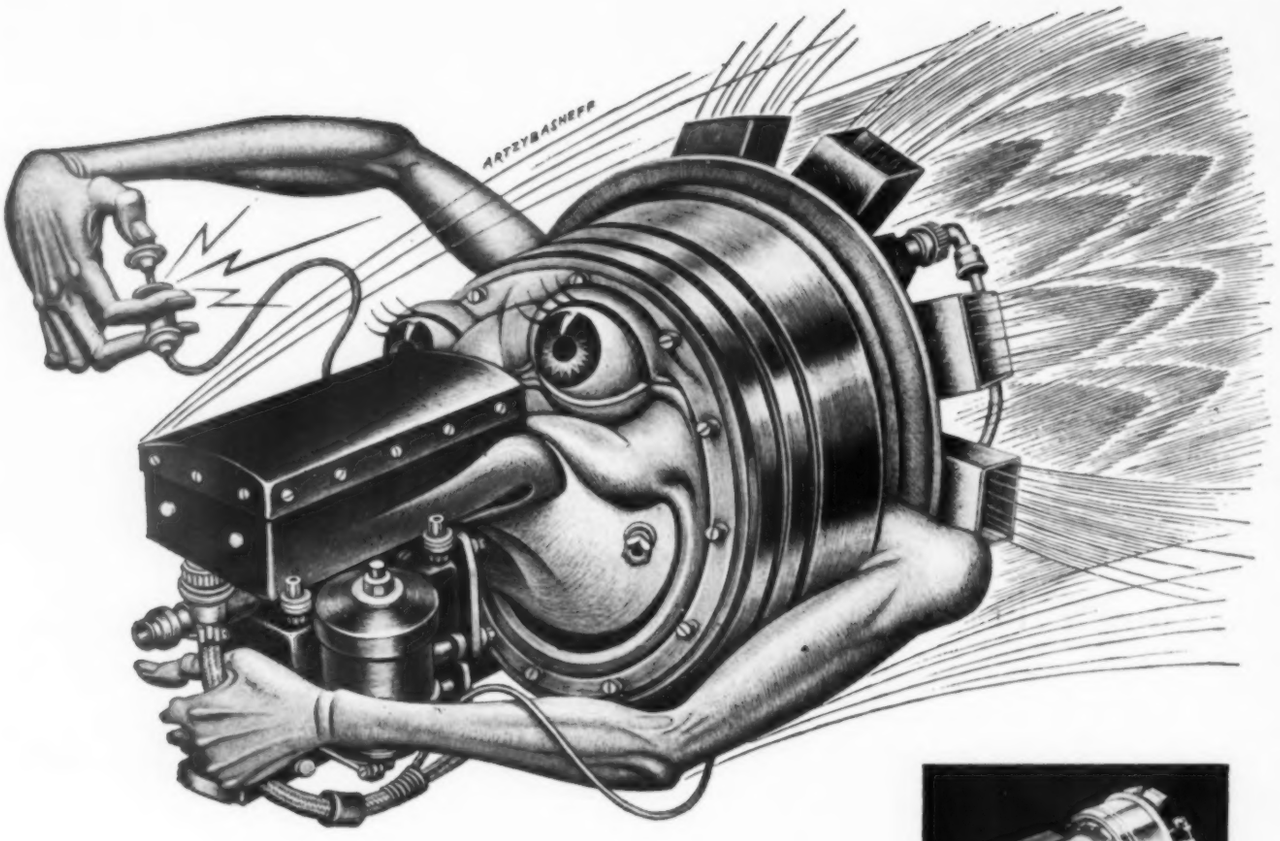

Parts that put new "starts" in jets

Good news for new-born jets! This typewriter-size Bendix Aviation self-starter is *built-in* . . . develops 340 horsepower in just 3½ seconds . . . enables a jet's main engine turbine to reach take-off speed in a matter of seconds after the pilot hits the starter. No more precious minutes lost while ground crews bring up mobile auxiliary starting power!

For 14 of the rugged, dependable, precision-machined parts that make up this self-starter for jets . . . Eclipse-Pioneer Division of BENDIX AVIATION CORPORATION looks to Lycoming.

Do *you* need precision parts . . . or any other of the diversified services listed with our signature? Lycoming's wealth of creative engineering ability . . . 2½ million square feet of floor space . . . and 6,000-plus machine tools stand ready to serve you. *Whatever* your problem . . . *look to Lycoming!*

Just off the press! "THE LYCOMING STORY". . . 40 interesting, illustrated pages showing many ways Lycoming is ready to help you. Write for it on your letterhead.

For 14 major components of the first mass-produced self-contained starter ever built into large jets, Bendix Aviation looks to Lycoming for precision production.

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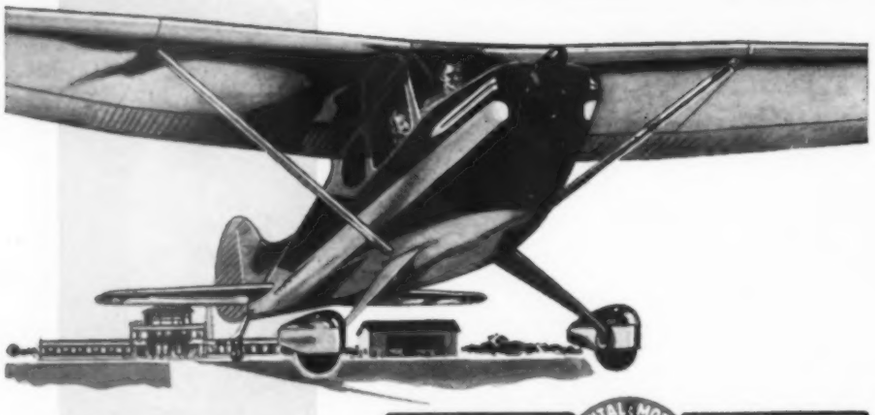

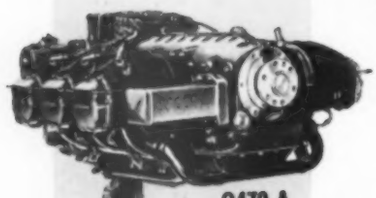

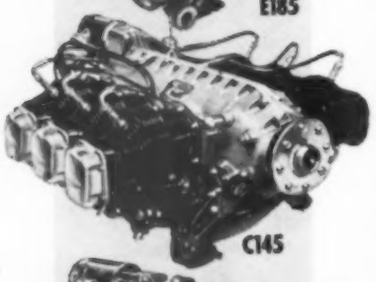

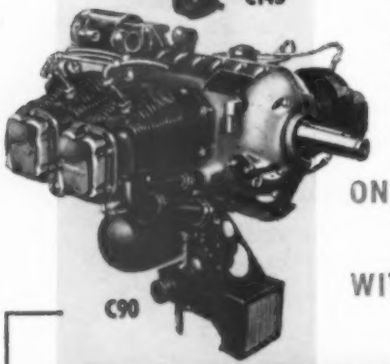

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Any way you look at it, Continental is the undisputed leader when it comes to powering planes of utility types . . . and its leadership, in all the things which go to make up that quality, was never before so complete—so dominant—as it is today. More and more of the world's finest business and executive aircraft are flying with dependable Continental Red Seal power.

ONLY CONTINENTAL BACKS YOU WITH ESTABLISHED

Continental Motors Corporation
Aircraft Engine Division
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AIR REPORT

(Continued from page 5)

1,853,000 hours in 1952 while 19,400 individually-owned aircraft logged 1,271,000 hours of business flying in 1952. Manufacturing and mining (exclusive of aircraft, auto and petroleum) accounted for 616,000 hrs.; farming, ranching and related activities 559,000 hrs.; the aviation industry 427,000 hrs. of business flying other than for-hire; the petroleum industry 371,000 hrs., and construction and real estate 286,000 hrs. In other types of flying, instructional flying totalled 1,503,000 hrs., which was off 21 per cent from 1951, and pleasure flying totalled 1,629,000 hrs., down 13.4 per cent to a new post-war low. Commercial agricultural flying totalled 707,300 hrs., a 3.2 per cent gain over 1951. Passenger and cargo flying for hire, including that by irregular carriers but not military contract or scheduled airline flying, was up 6.8 per cent to total 703,000 hrs. Other facts from the CAA booklet, available at 50 cents a copy from the Department of Commerce, Washington 25, D. C., include data showing 34,050 aircraft, or 57 per cent of all aircraft engaged in general flying during 1952, had some form of radio equipment.

A FRIENDSHIP AIR CARAVAN FOR LIGHTPLANES will fly around the Gulf of Mexico and Caribbean shorelines to promote air tourism. It was to start in March, with stops at Brownsville, Houston, New Orleans, Tallahassee, Miami, Havana, Le Fe, Merida, Campeche, Villahermosa, Vera Cruz, Acapulco and Mexico City.

THE NATIONAL BUSINESS AIRCRAFT ASSOCIATION will hold its annual convention in Dallas Oct. 27-29, 1954. Al Harting, Southwest Airmotive, Dallas, is arrangements committee chairman.

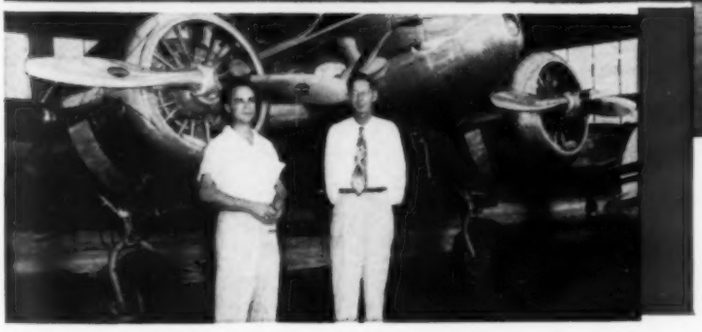
ANOTHER TRANS-ATLANTIC VACATION IN A 2-PLACE LUSCOMBE SILVAIRE is planned for June by Peter Gluckmann, the California watchmaker who visited England last year in the plane. Temco Aircraft at Dallas, which once produced Luscombes, said Gluckmann has ordered additional fuel tanks and has been sent additional engineering data. . . . **OVERHAUL OF A LARGE NUMBER OF AIR FORCE C-47 TRANSPORTS** is under way at Temco Aircraft's Greenville division and will continue into early 1955, according to Robert McCulloch, president.

BACKLOG ORDERS FOR NEW BENDIX DME UNITS have passed the quarter-million-dollar mark, with the first two deliveries going to Anderson Aircraft Radio Co. of Detroit and Qualitron, Inc., at Burbank. Anderson will install the first unit in a Fruehauf Trailer Co. Lockheed PV-1.

(Continued on page 38)

On New Orleans Airport It's Magee Aircraft for Service!

Esso



A LARGE WELL-EQUIPPED HANGER and spacious concrete apron are only a part of the facilities of the Magee Aircraft Company, operating at New Orleans Airport.

KEN MENARD AND R. W. MAGEE pose in front of one of the many ships that their company services daily.

"SOME YEARS AGO we foresaw the tremendous potential in the business aircraft industry and streamlined our operation to cater particularly to this phase of aviation. The rapid increase in the use of business aircraft has justified and rewarded our efforts. Looking back, we see that our most important decision was to operate strictly on a high quality basis. The excellent quality of Esso Products and their wide distribution and fine reputation were only a few of the many factors which guided our choice."

R. W. Magee, President, Magee Aircraft Company, Inc

DEPENDABLE ESSO AVIATION PRODUCTS offer high quality, backed by constant research and development at one of America's largest and finest petroleum laboratories. Flying executives, private plane owners, and commercial airline operators *know* they can depend on the products that carry the famous Esso Oval trade-mark.

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1,901 Engines Overhauled by Dallas Airmotive in 1953

Yes, Dallas Airmotive Overhauled 1,901 Engines in 1953 — 65 Per Cent More Than in 1952

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Here, at the Scintilla Division of Bendix, the word SERVICE is much more than the name of a department. It is a vitally important part of our over-all operations. Together with Research, Engineering and Manufacturing—Service might well be termed the fourth dimension of our business.

To implement this policy of following through to see that every customer gets the full performance built into each product, the Scintilla Division has a world-wide service organization backed up by factory-trained service men strategically located to meet service emergencies.

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PERFORMANCE!

We matched Clair Smith with Eclipse-Pioneer's 14608 electrical attitude horizon indicator and 12143 inverter because seldom have we seen three neater or more reliable packages. Clair's sunnytime raiment helps make the point that the weather's always more inviting if you have this electrical gyro to supplement vacuum instruments in your flying machine. It permits 360-degree maneuvers without tumbling, has a 10-second fast-erection device, and a power failure warning flag. The inverter (250 VA output, single or 3-phase) weighs but 13 lbs., also may be used as a spare power source for radio gear. Contact us for immediate delivery and for Eclipse-Pioneer authorized installation and service. As for Miss Smith, she's 21, 5'7", 115 lbs., blonde, and green-eyed.

Southwest Airmotive COMPANY
LOVE FIELD | DALLAS

Just among ourselves

VALUABLE CONTRIBUTIONS TO AIR EDUCATION

FROM upper New York state last month, where most people would least expect it, came two announcements that promise to help the cause of air age education in the United States.

Two relatively small companies, alert to the necessity of accelerating aviation education, and each acting on its own initiative completely independent of any other programs or movements, made these significant announcements. From Binghamton, Ed Link, chairman of the board of Link Aviation, announced the establishment of the Link Foundation, with generous funds to be made available to non-profit educational and scientific institutions for development of materials and other air age education teaching aids for use in schools, for scholarships to teachers and students and for research projects which further advance flight training methods. From Elmira, Bill Schweizer, vice president of Schweizer Aircraft Corporation, announced that his company has established an educational division with a program of school projects that will encourage interest in aircraft construction on the part of school shop teachers and students.

At considerable expense Schweizer has prepared a series of aviation construction kits with related instruction material so that shop students from elementary to junior colleges can learn by doing. Schweizer is aware of the slackening interest in aviation by students of all ages and the need for school projects to create greater enthusiasm for aviation, especially in the mechanical and engineering phases. What little aviation construction is taught today in some vocational schools is principally obsolete. The Schweizer engineers have developed kits based on modern construction and they include blueprints, manuals, production methods and other useful information. All kits are well within the budget range of students as well as smaller school shops and vocational schools with limited budgets.

These two recent developments could not come at a more propitious time because aviation education for American youth has been getting lots of lip service lately but very little action or real tangible assistance from the people who should be helping. Too few of the real aviation leaders are inclined to look very far beyond the fence surrounding their own little bailiwicks. Perhaps the people who should be doing most in pushing for more enlightened aviation education are doing less than anyone.

Take Los Angeles, California, for example. The largest industrial payroll in that area is the aviation industry, which accounts for about thirty-five per cent of the total U. S. aircraft industry. It is logical that about twenty per cent of the high school graduates in Los Angeles get jobs in aviation. But never in their school careers do they learn anything about the industry that absorbs them! Los Angeles offers excellent courses in agriculture with a garden plot in every single school. Hundreds of thousands of dollars are invested in linotypes and foundry equipment to teach such specific trades to students. Graduates from these courses usually have to leave Los Angeles to get jobs while the Los Angeles aviation industry can't fill 119 job classifications out of the 340 in the industry. Los Angeles' school children can learn all about chicken sexing and grape culture but nothing about the industry that hires twenty per cent of the high school graduates.

"From her beacon hand glows world-wide welcome."—de Havilland Gazette.

The same industry spokesmen who go about the country condemning or criticizing our education system might better stay home and follow the worthy example of Link and Schweizer in making some concrete contributions to the cause. The next time you hear our school system being lambasted for failure to modernize or to inaugurate aviation courses, better listen with tongue in cheek for the odds are fifty to one that the character on the microphone never turned a hand in his own community to work with the local school board on the matter.

Let us all hope that the Link and Schweizer contributions to air age education are signs that industry leadership is waking up to a mighty important responsibility that's been neglected far too long in every state in the union.

LINDBERGH DESERVES IT

UNFAIR criticism was heaped upon Charles A. Lindbergh when he warned the world of German air strength. Despite official disfavor, Lindbergh rendered invaluable service during the war. Long years later comes President Eisenhower's recent nomination promoting the colonel to the rank of brigadier general in the Air Force Reserve. No other Air Force promotion has been more deserved. ★ ★ ★

a nose for business

MAYTAG—another famous trade-mark on the nose of an Aero Commander. American Industry is finding the five-to-seven-place, twin-engine Aero Commander the perfect executive transport for speeding up and expanding their operations through greater utilization of the time of key personnel.

AERO DESIGN Commander

AERO DESIGN AND ENGINEERING COMPANY

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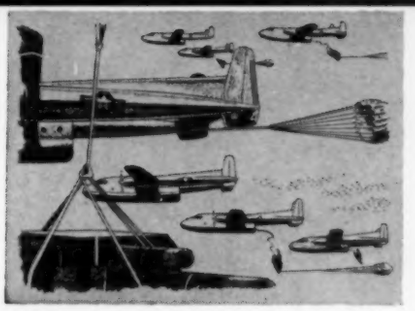

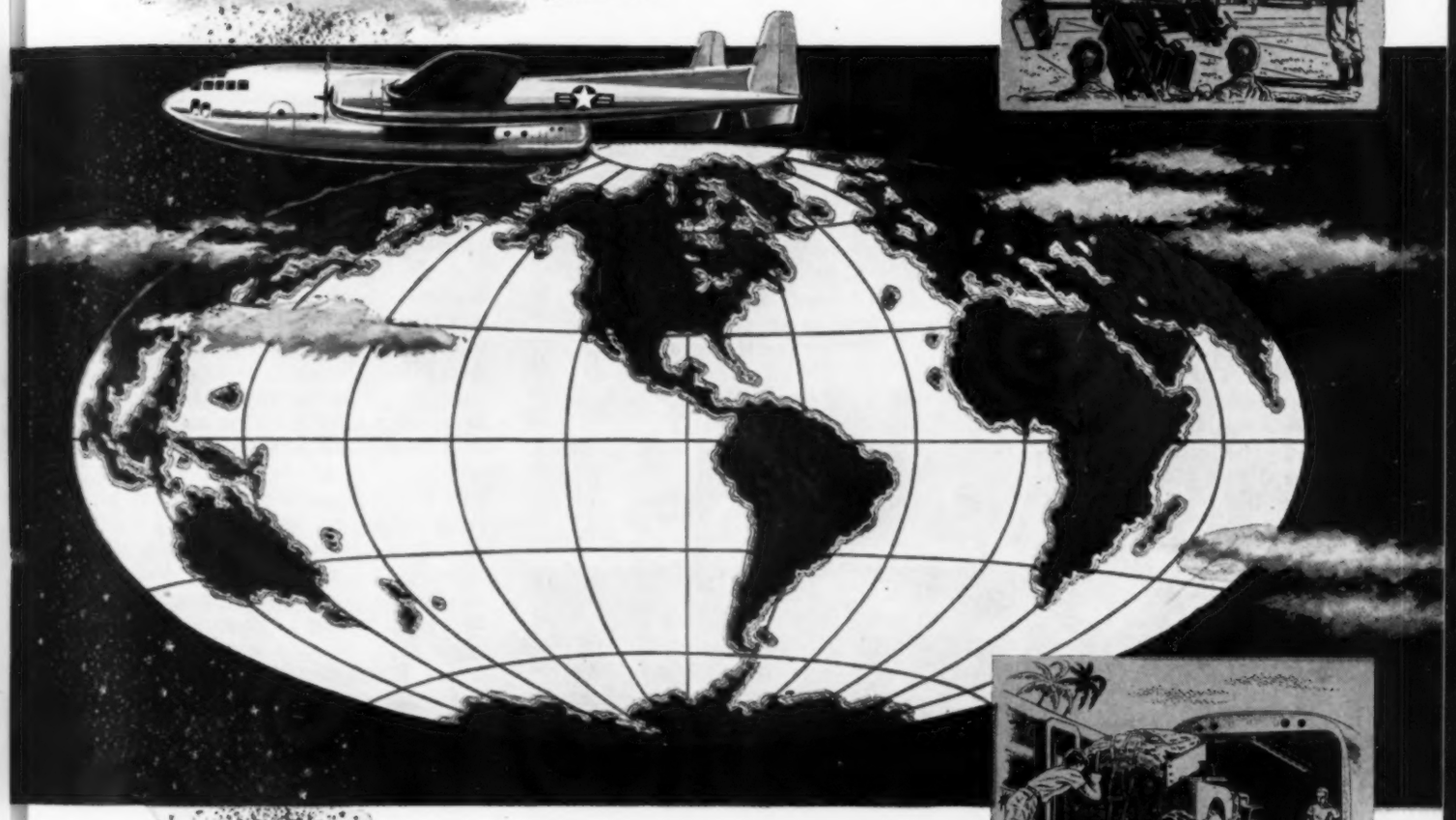

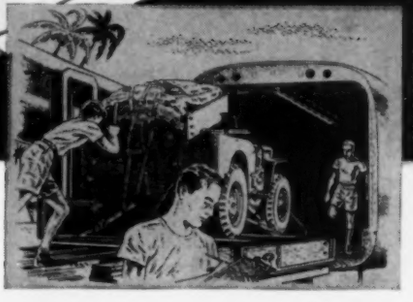

Only airplane designed and built from stem to stern to handle big bulk military loads is the C-119 "Flying Boxcar". Fully equipped troops, guns, ammunition, road-building machinery, helicopters . . . these and countless other types of bulk military loads are shipped to every part of the world at an impressively low cost per ton mile delivered in the Fairchild C-119.

Designed especially to load, fly and unload big bulky cargoes, the "Flying Boxcar" is flying everywhere in the service of America's Armed Forces and those of the United Nations.

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD
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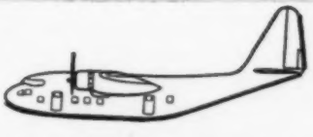
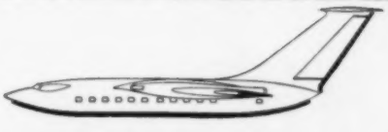


In production soon, the C-123 advance base military carrier.



For the coming American jet age, the M-186 Jet Transport.

Engine Division, Farmingdale, N. Y. • Guided Missiles Division, Wyandanch, N. Y. • Speed Control Division, Wickliffe, Ohio • Stratos Division, Bay Shore, N. Y.

Automatic Spiral Stability

Dave Blanton's low-cost Javelin makes cross-country flying safer and easier

By GEORGE HADDAWAY

AN intense young man with a plan is Dave Blanton of Wichita, Kansas. He hopes to make flying a lot easier and safer with a device that provides directional control at a cost within the reach of every lightplane owner.

After many years of painful experimentation his mechanical means of providing spiral stability has been type-certificated by the Civil Aeronautics Administration for the Cessna 170 and Piper Pacer. Called the Javelin single-axis automatic pilot, the device will soon be available for other makes and models. The installation costs $495 for the Cessna 170 and for the Pacer $554.10. Blanton has already delivered a hundred units for these two airplanes.

The lowliest amateur pilot knows that airplanes inherently are spirally unstable machines, that true hands-off flying is something for the birds. Every kiwi knows that an airplane simply doesn't want to go straight, that it has built-in spiral instability, that if you fly feet and hands off the controls it will fall off into a right or left spiral and if not checked, augur right into the ground.

Most cross-country fatal accidents involve non-instrument pilots getting into the soup and spiralling into the ground within a very few minutes after losing outside reference. Blanton's Javelin, with a quick flick of a switch on the instrument panel, makes the airplane go straight. The Javelin can mean substantial reduction in the type of accident now the big killer in general aviation.

Aside from the tremendous safety implications of the Javelin, a short demonstration flight is all you need to be convinced that this ingenious method of providing directional control can reduce cross-country fatigue by as much as 50 or 70 per cent. While Blanton does not advocate intentional instrument flight with his Javelin, he does believe it will prove a boon to rated instrument pilots in taking a lot of fatigue out of flying. Working the radio, checking maps and looking up flight data is a lot easier when Blanton's Javelin is keeping the airplane flying where you point it.

The Javelin consists of a large electrically-driven slave gyro, sensitive relays controlled by gyro-operated contact points, and a fluid drive clutch. The gyro and electric servo motor are mounted on the directional axis of the airplane behind the baggage compartment in the fuselage. The only control necessary is an ON-OFF switch on the instrument panel.

Another development nearly as important as the automatic pilot itself is the electric directional trim system provided in the installation kit for airplanes that do not have means of directional trim. This system is controlled by a toggle switch also mounted on the instrument panel. In order to aid the pilot in keeping the airplane in trim under instrument conditions, two trim indicator lights are mounted adjacent to the trim switch and are operated by the gyro.

With the gyro spinning at 15,000 rpm. on the directional axis, any at-

Dave Blanton, inventor of the Javelin, pointing to control cables leading from the power supply to the rudder on a Cessna 170.

Panel installation in Cessna 170 of Javelin on-off switch, blinker lights and trim toggle switch. Lights indicate need for trimming by holding toggle to left or right.

tempt of the airplane to change its heading either to the right or left causes the gyro to close a set of contact points which in turn shoot electric current into the servo motor. This motor drives the fluid clutch, which actuates the rudder by means of cables.

Blanton's demonstration starts with the take-off. He turns the Javelin on, holds the trim switch all the way to the right to compensate for torque, and then takes off. The minute he gets his 170 airborne, off comes hands and feet from the controls and the ship climbs out holding its heading with only a few degrees variation from right to left.

As the airplane is leveled off for cruise and throttled back, the left trim light on the instrument panel starts to blink, since the airplane is then out of trim directionally. This calls for holding the toggle switch momentarily to the left until the airplane trims out on course.

As soon as he gets the proper trim with the switch, you just sit back and watch it hold a steady course. If a wing gets down and the airplane attempts to change its heading the gyro sends a signal to the servo motor which starts applying a smooth pressure through the fluid clutch to the rudder, which holds the airplane straight. This allows the airplane to take advantage of its lateral stability as it never has before, resulting in the wing immediately coming back up without any change in heading.

While the climb-out demonstration on take-off is impressive, we got a bigger kick out of putting the 170 into a spiral with the switch off, then when she got to going good, throwing the switch and watching her straighten out. The response is immediate. The wing comes up as if by magic and the ship starts flying on a definite heading with very minor oscillations.

Although we never intend to fly single-engine instruments it would be a mighty wonderful feeling to have that Javelin standing by just in case we ever got caught like some of the folks we knew who never lived to tell about the deadly spiral. For non-instrument cross-country pilots, the big feature will be the use of the Javelin while map checking, tuning the radio or looking up frequencies. For who among us fails to get irritated by the airplane's antics when we get off the controls even for a few moments?

The Javelin single-axis automatic pilot is the first to be approved in utility category. It cannot be damaged by aerobatics or by overpowering it. Blanton takes understandable pride in this, since conventional automatic pilots have gyros that will tumble in violent maneuvers and can fly the airplane into a spiral instead of out.

On the feet-off landing with the switch on, the Javelin was hard at work, trying to make the airplane go straight even though it doesn't have the power to steer the tailwheel.

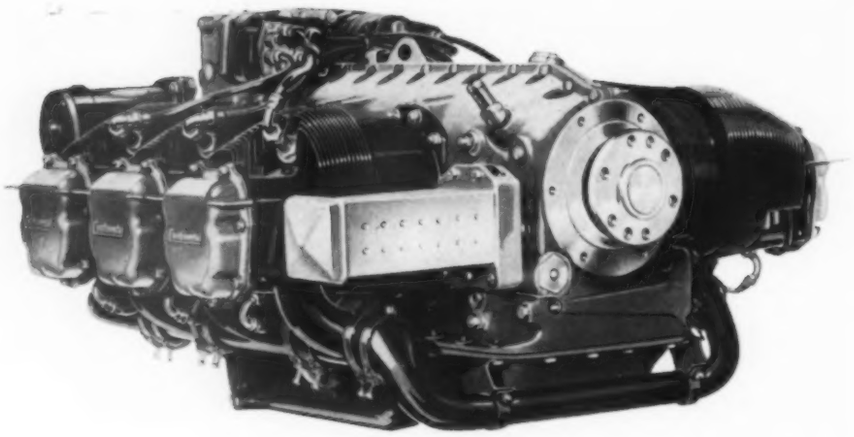
It seems to us you really get a lot for your money with this ingenious device. The retail price tag on the Javelin is $345, installation kits are $135 to $159, depending on the make and model of airplane, boat, or helicopter you want to install it in. The cost of labor for installing is around $25.

Blanton has already delivered 100 units for Cessna 170's and Piper Pacers and is maintaining a production rate of five per day. Engineering for installation kits is now being completed for the Cessna 180, single and twin-engine Navions, and the new Piper Twin.

About the best recommendation we can give Blanton's Javelin after our

(Continued on page 45)

Dave Blanton (left) goes over installation drawing with two Cessna 170 owners who have had the Javelin installed in their airplanes — Del Fuhriman of Tremonton, Utah, and Lee J. Talladay (right) of Milan, Michigan, National Flying Farmers Association president. Fuhriman has planned a nonstop flight in his 170 from Seattle to Miami. Picture was made at Ken-Mar Airpark in Wichita, Kansas.



Front view of new O-470-B Continental shows new 5⅜-in. propeller flange which is being pioneered by Continental. Just to left of flange is new integrally-mounted oil cooler designed for down-flow of cooling air. Note large cooling fin area on cylinders.

Continental's New 240-Hp. Six

CONTINENTAL'S Model O-470-B which powers the new Cessna 310, brings to general use aircraft notably higher standards of performance and dependability, in an engine of unusually compact design. It also embodies refinements which, in their aggregate, simplify routine maintenance and greatly reduce its cost.

External oil lines have been done away with entirely. A new oil cooler of Continental Motors design is integrally attached to the crankcase, utilizing the down flow of air, as do the cylinder fins. An oil filter of the full-flow type is mounted within the crankcase at the former location of the screen which it supplants.

Factors making for compactness include elimination of a separate accessory case, accessory drives being provided within the crankcase itself. Two standard accessory drive pads are provided at the top of the crankcase, rear. These are in addition to normal drives for starter, generator, tachometer, fuel pump, and magnetos. The latter are located on the top of the engine ahead of the mounting brackets, for ease of access. The propeller governor drive is located at the left side of the crankcase nose, near the propeller, and has no external lines.

A new low-cost starting motor of Continental design, and of minimum size, is mounted at right angles to the main axis of the engine, in a rear position which allows minimum envelope. It incorporates over-running and over-loading features, provides for push-button starting, and has a torque ratio of 48 to 1. Twelve-volt generator of automotive type is mounted at left rear, and is driven by v-belt from a pulley at the rear end of the crankshaft. This arrangement eliminates all torsional vibration and coupling problems normally associated with the generator drive.

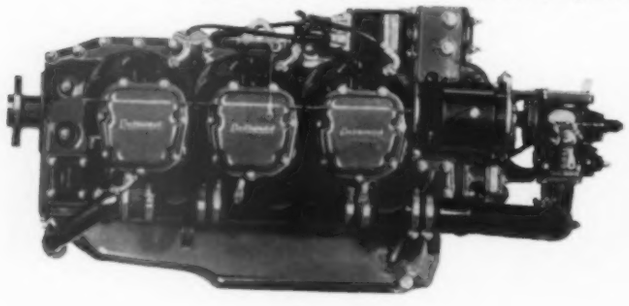
As a result of the re-positioning of the various components and accessories, a minimum overall height of 19.62 inches is obtainable. With the carburetor at the rear, overall length becomes 43.81 inches with no increase

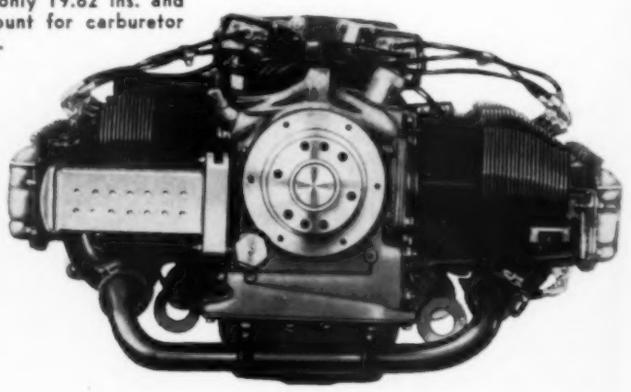
(Continued on page 44)

SPECIFICATIONS

Type certificate No.	**Pending**
Number of cylinders	**6**
Bore (inches)	**5**
Stroke (inches)	**4**
Displacement (cu. in.)	**471**
Ignition	**Dual**
Type of Prop Dr. Sp. Flange	**Direct**
Compression ratio	**8.0-1**
Rated power (sea level)	**240**
Take-off power (sea level)	**240**
R.P.M. at rated power	**2600**
R.P.M. at take-off power	**2600**
Recommended fuel, min. octane	**91**
Dry weight with carburetor	**408.25**
Weight equipped (with starter, generator, voltage regulator, oil cooler and fuel pump)	**450**
Shipping weight	**690**
Crankshaft rotation	**Clockwise**
Dimensions with standard equipment installed:	
Length	**43.81**
Width	**33.64**
Height	**19.62**
Standard equipment:	
Oil sump	**Integral**
Spark Plugs	**Champion**
Carburetor	**Bendix-Stromberg**
Magnetos	**Scintilla**
Radio Shielding	**Continental**
Starter	**Delco-Remy**
Generator	**Delco-Remy**
Voltage regulator	**Delco-Remy**

Side and front views show extreme compactness of the new engine, which powers the new twin-engine Cessna 310. Overall length is 43.81 ins., height is only 19.62 ins. and width is 33.64 ins. Equipped weight is only 450 lbs. Note rear mount for carburetor behind accessory pads and belt-driven generator.





Lockheed's new jet trainer, on which it spent a million dollars as a private developmental project for demonstration and eventual sales to military forces. Allison Division of General Motors provided an improved J33-A-16A engine. Plane has 600-mph. speed, 42-ft. span including 230-gal. tip tanks, 38-ft. length and 13-ft. height. —(Lockheed Photo.)

New Jet Trainer

RETAINING many features of the widely-used T-33 but with numerous advancements, a newly-developed 2-place tandem jet trainer is being demonstrated by Lockheed Aircraft Corporation at military bases. Besides basic flight indoctrination, the trainer is intended for instruction in advanced navigation, gunnery, rocketry, dive bombing and all-weather flight.

Lockheed said the 600-mph. jet provides trainer innovations including (1) a landing slow-down parachute, (2) speed and climb equal to many combat jets, (3) duplicate navigational and electronic aids for both student and instructor, (4) full-circle visibility with a new-type canopy and (5) improved controllability with automatic wing leading-edge "slats." The instructor's rear seat is elevated 6 inches for better visibility for him.

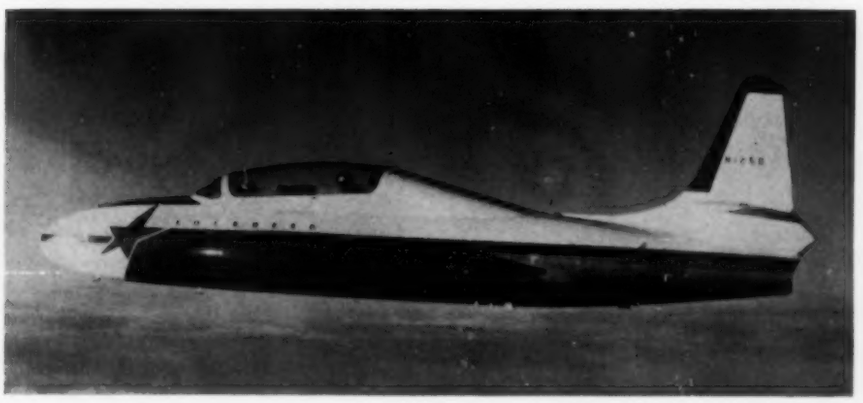
The company invested a million dollars in an 18-month development project to produce the new trainer. It is powered by a J33-A-16A centrifugal-flow jet engine provided for the project by the Allison Division of General Motors. This engine has 30 per cent more thrust than earlier jet training plane power plants and is perfected for longer utilization between overhauls. It is said to offer faster acceleration and sharper climbing performance.

Leading-edge "slats" automatically move forward and down on tracks and rollers in coordination with air speed and angle of attack, moving some 17 degrees from closed to open. Excellent stall characteristics are said to be the result of their use.

For spin control, the horizontal stabilizer is 20 inches higher than the

(Continued on page 36)

Leading-edge slats for improved stall characteristics in the new trainer move forward and down automatically with slow speeds and high angles of attack (left). Flight view shows new-type canopy and elevated rear seat for instructor. (Lockheed Photos.)



Photos show steps in Van der Horst Corporation's Porus-Krome process. Parts of cylinder not to be plated are covered by protective coating of wax (left). Second view shows workman lowering cylinder into plating bath. Rectifiers on the left control plating current to each cylinder. After plating, cylinder is honed (third picture) to specified dimensions. Last picture shows one of 8 inspections given cylinders in process.

Control For Oil Consumption

Proved in military engines, porous chrome plating solves commercial aircraft problems

CHROMIUM hardening of aircraft engine cylinder bores is being used on a larger scale than ever in commercial aviation through a process in which the chromium is chemically etched so that microscopic pores and channels in the hard metal can serve as reservoirs for lubricating oil. It is credited with extending cylinder and piston ring useful service and greatly reducing oil consumption. Old cylinders are renewed by the process and it is also being applied to cylinders on new-production engines.

An example is the use of the process on 300-hp. Jacobs R-755 engines for commercial airplanes, such as the Cessna 195. Jacobs Aircraft Engine Co., Pottstown, Pa., uses the "Porus-Krome" process applied by the Van der Horst Corporation of America. Donald C. Frederick, Jacobs service manager, reports that Porus-Krome has cut oil consumption 60 per cent in Jacobs R-755's. The following are comparative oil consumption figures from Jacobs Aircraft Engine Company on 10 engines with plain cylinder barrels and 10 engines with cylinder barrels processed by Van der Horst with Porus-Krome, the figures being pounds of oil used per hour:

ENGINES

With Plain Cylinders Lbs.		With Porus-Krome Bores Lbs.	
Engine 1	3	Engine 1	1.5
Engine 2	2.75	Engine 2	2
Engine 3	2.5	Engine 3	1.5
Engine 4	3	Engine 4	1
Engine 5	4	Engine 5	1
Engine 6	4.12	Engine 6	0.75
Engine 7	3	Engine 7	1.5
Engine 8	3.5	Engine 8	1.5
Engine 9	4	Engine 9	1
Engine 10	3.5	Engine 10	1.25

Says the Jacobs service manager: "The average oil consumption for engines with plain cylinders was 3.337 lbs. per hr., as compared with an average oil consumption of 1.3 lbs. per hr. on engines with chrome barrels. Oil consumption has been reduced about 60 per cent with the new type barrels and rings.

Enlarged 200 times, Porus-Krome channel surface looks like these sections. Top is a cross section of Porus-Krome on steel, showing relative depth of channels. Lower view shows microscopic channels etched into chromium for extreme wettability of surface.

"In addition, we have checked some of the overhaul records with regards to chrome plating and thus far no Porus-Kromed cylinders have been replaced because of cylinder wear. We have been using chromed barrels since April 24, 1951, and since that time have overhauled a number of engines here at the factory and at no time was a cylinder replaced, with but one exception and that was due to an accident.

"In addition to the reduced oil consumption and the unmeasurable wear at 1,000 to 1,500 hrs. of engine operation, Porus-Krome plating has entirely eliminated scoring, a condition which was frequently found with old-type barrels.

"Because of the very favorable results with the chromed barrels, all Jacobs aircraft engines currently produced have Van der Horst Porus-Krome-plated cylinders."

The Van der Horst Corporation, which operates plants at Olean, N. Y., Terrell, Tex., near Dallas, and Los Angeles (Spar-Tan Engineering, West Coast licensee), reports similar results from the use of its process on 260-hp. Lycoming aircraft engines, Pratt & Whitney R-985 and R-1830 aircraft engines, Continental C-90 aircraft engines and others. Its Porus-Krome process has been used on hundreds of thousands of aircraft engine cylinders for the Air Force and Navy and is used extensively on cylinders for diesel engines in ships, trains and oil field installations.

For commercial planes, the firm says its CAA-approved process will give cylinders twice as many flying hours before needing cylinder renewal at only one-fifth the price of new raw cylinders.

The process was originated by a Dutch scientist, Dr. Hendrik van der Horst, who reclaimed the cylinders of the diesel engines on the U. S. submarine *Squalus* when it was raised in 1939. His job was so effective that his process was used on 10,000 Navy diesels during the war. Both the Navy and the U. S. Air Force applied the Van der Horst process to aircraft engines during the war.

The two major causes of cylinder wear in aircraft engines are inadequate lubrication and abrasion of the bore of the cylinder by unfiltrable airborne impurities such as sand and grit that are entrained in the combustion air and ultimately are interposed between the piston and the bore of the barrel.

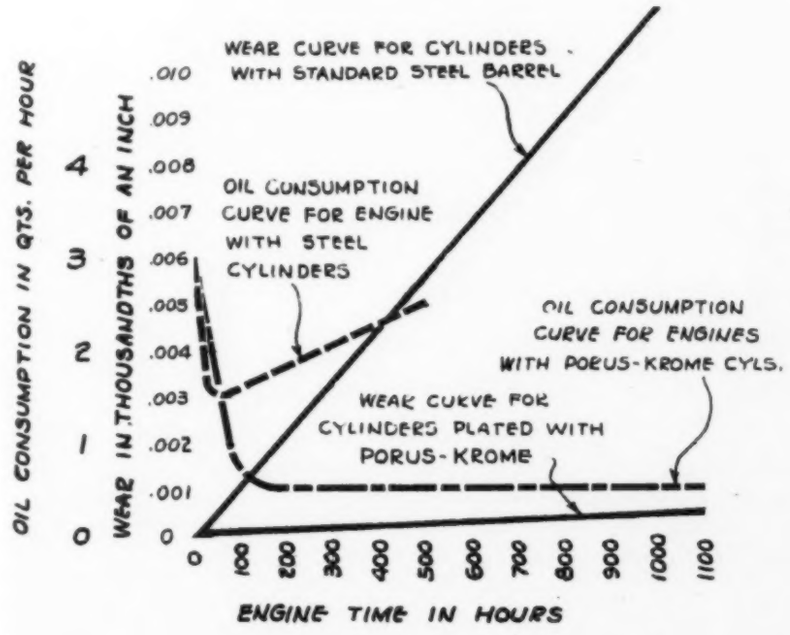
Lubrication in the high speed aircraft engine is not merely a matter of getting the lubricant to the point of surface contact—much more important is keeping the lubricant at the point of contact to afford the maximum of protection to the opposing surfaces, thereby reducing friction. Keeping the lubrication at the point of surface contact is entirely dependent upon one surface characteristic of metal that varies in degree from metal to metal—wettability. Wettability is the ability of a surface to retain and disperse a liquid much in the manner of a blotter.

The surface structure of porous chromium is such that examination through a binocular microscope would reveal thousands of minute pores or channels that act as reservoirs when a lubricant is applied. This surface structure provides for the ultimate in wettability, in comparison with the surface structure of steel that does not have these potential oil reservoirs and therefore has less wettability. Another advantage of this particular type of surface structure is relative to the engineering premise that the factors producing heat on the bearing surface of a cylinder barrel are speed, load, and the frictional characteristics of the opposing metals. Since the amount of friction depends to a great degree upon the actual net area of contact (between piston ring and barrel bore), obviously the reduced surface area of porous chromium contributes to a reduction in barrel operating temperature.

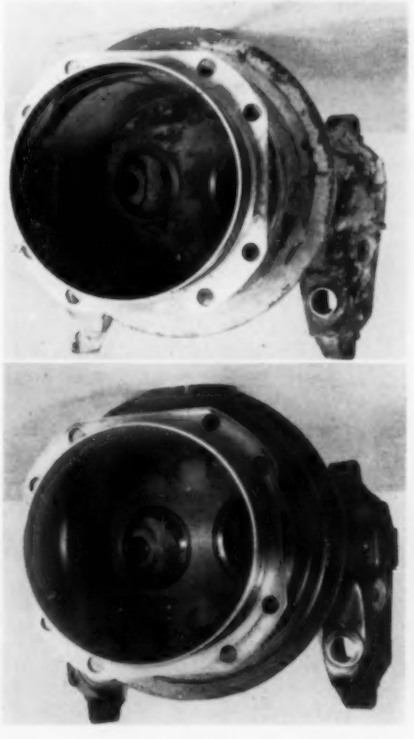
The inherent hardness of porous

(Continued on page 44)

Van der Horst Corporation has logged 1,500 hrs. in 2 years on 300-hp. Jacobs engine in its own test with Cessna 195, shown with company officials. Oil consumption has averaged only 1 pint per hour. During overhaul at 1,100 hrs., chrome-plated cylinders showed no measurable wear in laboratory examination. Before and after photos below show unplated cylinder (top) as received and as shipped after processing (bottom).



This Van der Horst chart compares wear and oil consumption for Porus-Krome with that for steel barrels in Jacobs R-755 engine.



Making Discounts Count

Parts and accessories can strengthen an operator's business—if he doesn't give 'em away

By GEORGE GALIPEAU

Vice President, Van Dusen Aircraft Supplies, and Chairman, Industry Relations Committee, Aviation Distributors & Manufacturers Association

IT'S no violation of trade secrets to point out that in recent years there have been some drastic changes in the sources of revenue that keep the airport service operator in business.

Five years ago, or ten, the average fixed-base operator made his living from student instruction, sight-seeing, and related flying activities.

The past few years have seen revenue from flight operations dwindle — in many cases almost to the vanishing point. I hardly need to point out that gold had to be discovered in other hills, or Mr. Fixed-Base Operator went out of business.

What are the sources of income that spell solvency for the operator today?

To answer this question, we surveyed a representative group of operators — successful operators, obviously, or they wouldn't have weathered the recent storms. We were looking for figures that would spotlight the present trends and give some indication of the sources of revenue to which an operator may reasonably look for his livelihood in 1954.

The survey was informal, and made no pretense at being exhaustive. The results cannot be compared with anything, since we have no similar records for five years ago, or the prewar period. However, the results were extremely interesting to us, and gave this revealing picture, by percentages, of the source of an average operator's income today:

Aircraft Sales	39%
Flight Instruction	23%
Aircraft Maintenance Service	13.5%
Parts and Accessories Sales	12%
Hangar Rental	5%
Gas and Oil	3.5%
Charter and Taxi	3.5%
Miscellaneous	0.5%

What does such a picture mean? Opinion is generally agreed on the emergence of aircraft sales as the number one source of revenue to the operator. More and more, emphasis is being placed on actual selling, with special attention to the new business and private markets being opened up through the aircraft manufacturer's advertising programs.

Flight instruction is way down, as a percent of the dollar income, while there is a widespread feeling that charter and air taxi business represents a potential for the future that is only starting to be explored.

Most cloudy of all the categories seems to be that of parts and accessories. Here you find the widest variation from one operator to another on just what this segment of his business amounts to — everything from zero to 28 per cent, according to our survey results.

Many operators who have "tasted blood," so to speak, regard the sale of parts, and especially of accessories like radio, as the real gravy — one of the most profitable aspects of their business. Other operators shrug off the question about income from this source and imply: "There ain't no such animal."

As a distributor of aircraft supplies, I naturally take a dim view of the latter outlook. But it doesn't surprise me. Fifteen years of firsthand dealings with operators in all parts of the country have made me all too familiar with the unrealistic attitude many have adopted toward sales of parts and accessories. Some simply don't want to be bothered with this phase of the business — generally because they have a vague feeling that in the course of a year it doesn't amount to much.

Right here, let's take a leaf out of the automotive industry book and review their history along similar lines.

During the formative days of automobiling, most dealers had little or no regard for the profit potential in parts and accessory sales. It wasn't until the days of the depression — and slim margins on new sales after big trade-ins — that the automobile dealer woke up to the fact that a good many of his profit dollars were in "extra" items.

Today, we in aviation face a similar situation, with the former mainstay of the operator — instructional flying — reduced to a minor fraction. The smart operator is becoming more and more conscious that his potential profits must lie in the direction of "extra" sales.

Items such as radios, metal propellers, tires and tubes, navigation light flashers, oil pressure warning lights, seat covers, sun shades, oxygen equipment, flares, oil filters, etc., are *needed* items for aircraft owners. They can, in many cases, be sold merely by suggesting to the plane owner that they are useful and available.

Fortunately, many of today's operators are alive to the value of this profit potential. Their awareness helps account for the generally healthy air-

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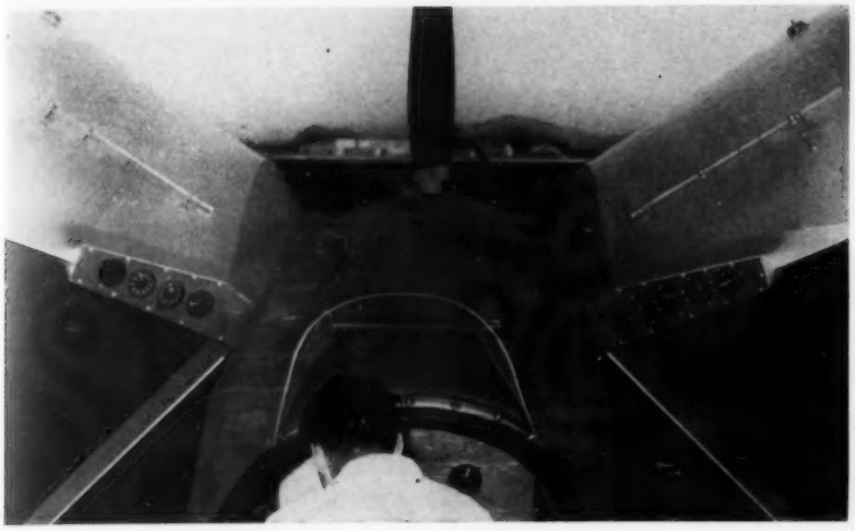


Air Tractor mounts instruments in gull roots of wing, which also house fuel tanks and gauges. Low flight is shown at right.

Air Tractor

AMONG countless experimental agricultural aircraft developments around the country, one is a big, square biplane for dusting and spraying developed by Central-Lamson Corporation at Yakima, Washington. Called the "Air Tractor," it has about the same span of a Stearman but is somewhat longer and higher. It is powered by a 450-hp. Pratt & Whitney Wasp Junior.

Considerable engineering work and flight-testing have been invested in the development. Flights with 2,500-lb. payloads have been made with the duster-sprayer. In a wind of zero to 2 mph., the Tractor with 2,500-lb. spray load took off in less than 1,000 ft., climbed at 450 fpm. for 2,000 ft. after take-off and landed with the load in 950 ft. The hard-surfaced runway had a 1,070-ft. elevation and temperature was 50 degrees.

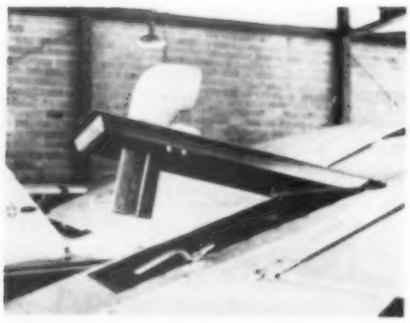
These figures, said Richard Baxter, Central-Lamson vice president, compare roughly to the performance of a 450-hp. Stearman carrying half the spray load. The Tractor did much better with a 1,500-lb. load, taking off in 410 ft., climbing 950 fpm., and landing in 350 ft.

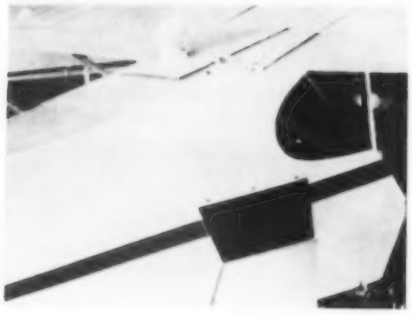
As indicated by the photos on this page, the Tractor incorporates numerous radical design features. Gull-wing section is for better forward visibility. The wing design uses a large, high-lift airfoil section. Wing panels are interchangeable as are tail surfaces. Spill plates on squared wing tips give effect of increased aspect ratio for better climb. Aft section of fuselage is left uncovered for easy cleaning. ★ ★ ★

Squarish crop plane has interchangeable wing panels and tail panels, using large, high-lift airfoil section with spill plates at wing tips. Big 2,500-lb. hopper is in front of pilot, who sits higher than in Stearman. —(Central-Lamson Photo.)

Piper PA-18-A agricultural model for 1954 is shown above rigged for spraying, with new high-capacity wind-driven pump and boom. These booms swing rearward in case a ground object is struck. Spray tank holds 110 gals. and can be used for dust.
—(Piper Photo.)

New Piper Crop Model





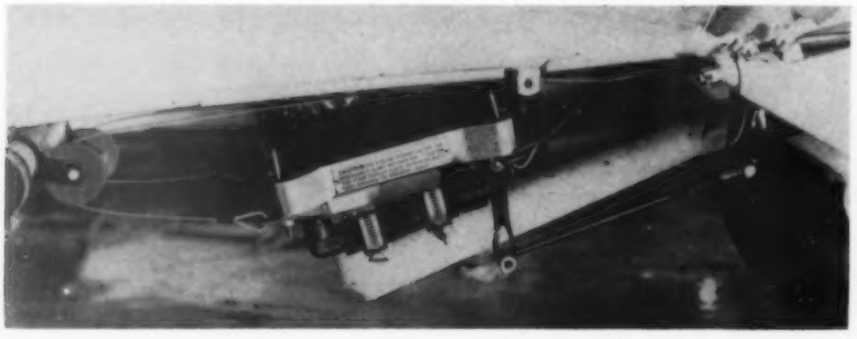
AS a result of continuing efforts of Piper Aircraft Corporation's agricultural development department and suggestions from the field, the new 1954 Piper PA-18-A agricultural plane incorporates a number of improvements and changes.

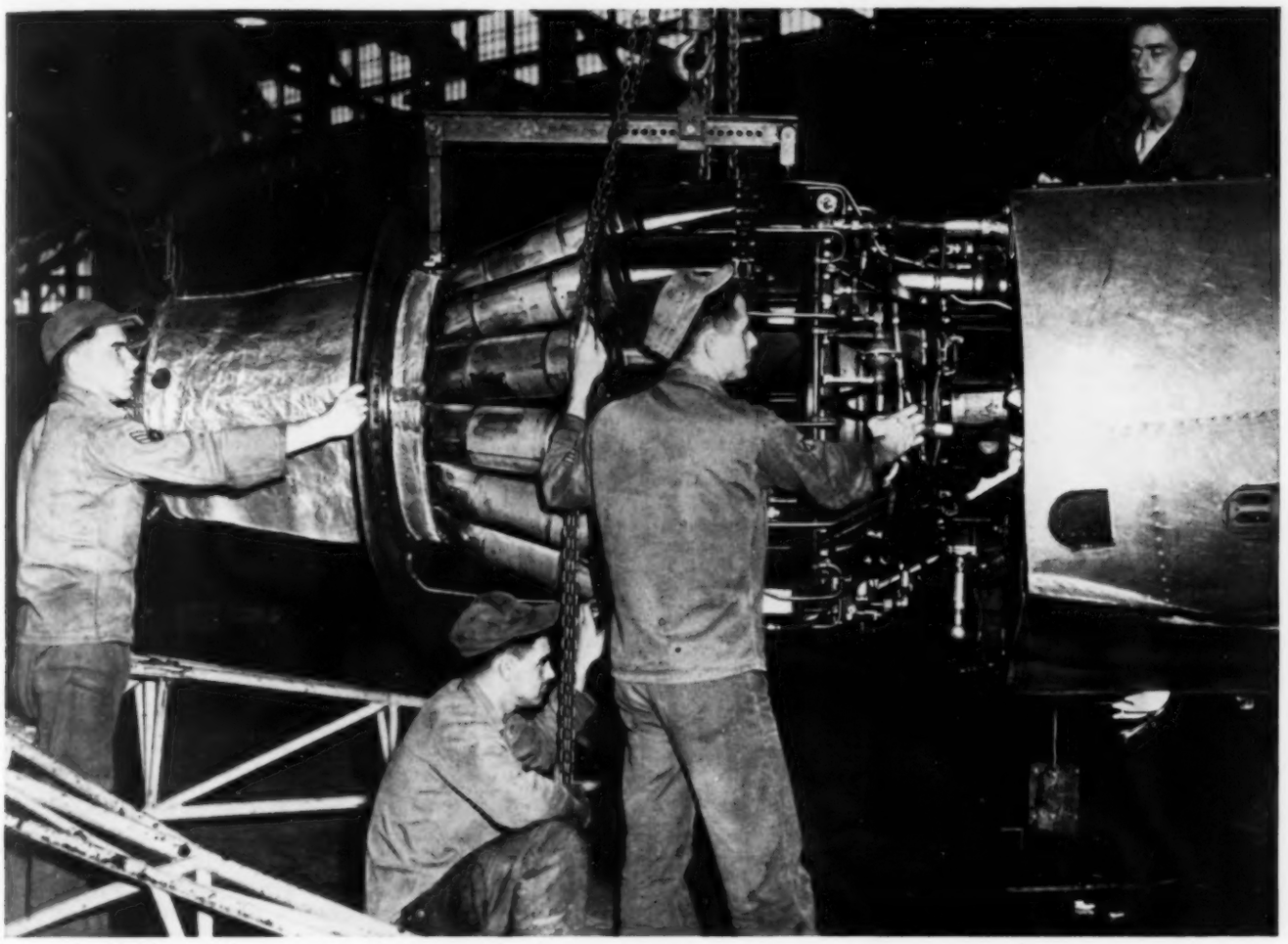
One significant development is a new quick dump valve for emergency use in which the pull of a lever in the cockpit will dump a full 110-gal. load of chemicals in only 7 seconds.

Now standard on the 135-hp. Piper sprayer is a 1-in. fan-driven centrifugal pump in direct line with the propeller blast for increased pump capacity. Also standard are spray booms with 24 nozzles and which are also drilled and tapped to receive 22

(Continued on page 36)

Large air scoop (left) funnels blast into dust bin to prevent dust from banking up. Wind-driven pump has new location forward in prop blast (right). Emergency dump valve (below) and 110-gal. chemical tank (lower right) are Piper improvements.
—(Piper Photos.)





Pulled for Time— at 1200 hours

Two separate Air Force activities have demonstrated the increase in life and dependability of Allison Turbo-Jet engines.

An Allison-powered Lockheed T-33 Jet Trainer at Webb Air Force Base has flown 1200 hours without even minor repairs to the engine. Line maintenance by the men of the 3561st Maintenance Squadron backed up Allison engine design and manufacture to set this remarkable performance record.

An Allison-powered Lockheed F-80 Shooting Star flew 1200 hours in combat and combat-alert service in Korea without major overhaul. That flight time adds up to more than 600,000 miles under tough combat conditions. The record represents a splendid job on the part of the 6160th Maintenance Squadron at Itazuke AFB, Japan.

Records like these are made by planes and engines—but it's the men behind the planes who make them possible. A hearty salute to the 3561st and 6160th Maintenance Squadrons for these splendid achievements.

GM GENERAL MOTORS

Allison

DIVISION OF GENERAL MOTORS, INDIANAPOLIS, INDIANA

World's most experienced designer and builder of aircraft turbine engines—*J35 and J71 Axial, J33 Centrifugal Turbo-Jet Engines, T38 and T40 Turbo-Prop Engines*

Close Inspection

BEECHCRAFT CERTIFIED SERVICE offers many extras to the aircraft owner — extras that do not appear on the service or maintenance bill. But these little extras mean a big saving through the year.

A good example of one of these extras is the CLOSE INSPECTION your airplane receives while it is being serviced on the ramp of a BEECHCRAFT CERTIFIED SERVICE STATION. Trained service personnel will spot — and call to your attention — any mechanism that is not functioning properly thereby eliminating costly repairs later.

BEECHCRAFT CERTIFIED SERVICE technicians, with their long Beechcraft experience and factory training, know your Beechcraft from front to rear. But most important, they take a personal interest — and pride — in seeing to it that your Beechcraft serves you well.

So when your Beechcraft requires service — bring it to one of the BEECHCRAFT CERTIFIED SERVICE STATIONS listed — where it's always *"in good hands."*

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General Mitchell Field, Milwaukee, Wisc.
Truax Field, Madison, Wisc.

ATLANTIC AVIATION CORP.
Teterboro Airport, (25 minutes from Times Square)
Teterboro, New Jersey
Logan Airport, East Boston, Mass.

ATLANTIC AVIATION SERVICE
New Castle County Airport, Wilmington, Delaware

BUTLER CO., AVIATION DIVISION
Municipal Airport, Chicago, Ill.

CURREY SANDERS AIRCRAFT CO., INC.
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CUTTER-CARR FLYING SERVICE, INC.
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GRAY AIRCRAFT SVC. CO., INC.
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J. D. REED CO., INC.
Municipal Airport, Houston, Texas

TOPEKA AIRCRAFT SALES & SERVICE
Municipal Airport, Topeka, Kansas

TRADEWIND AIRPORT CORP.
Tradewind Airport, Amarillo, Texas

TULSAIR DISTRIBUTORS, INC.
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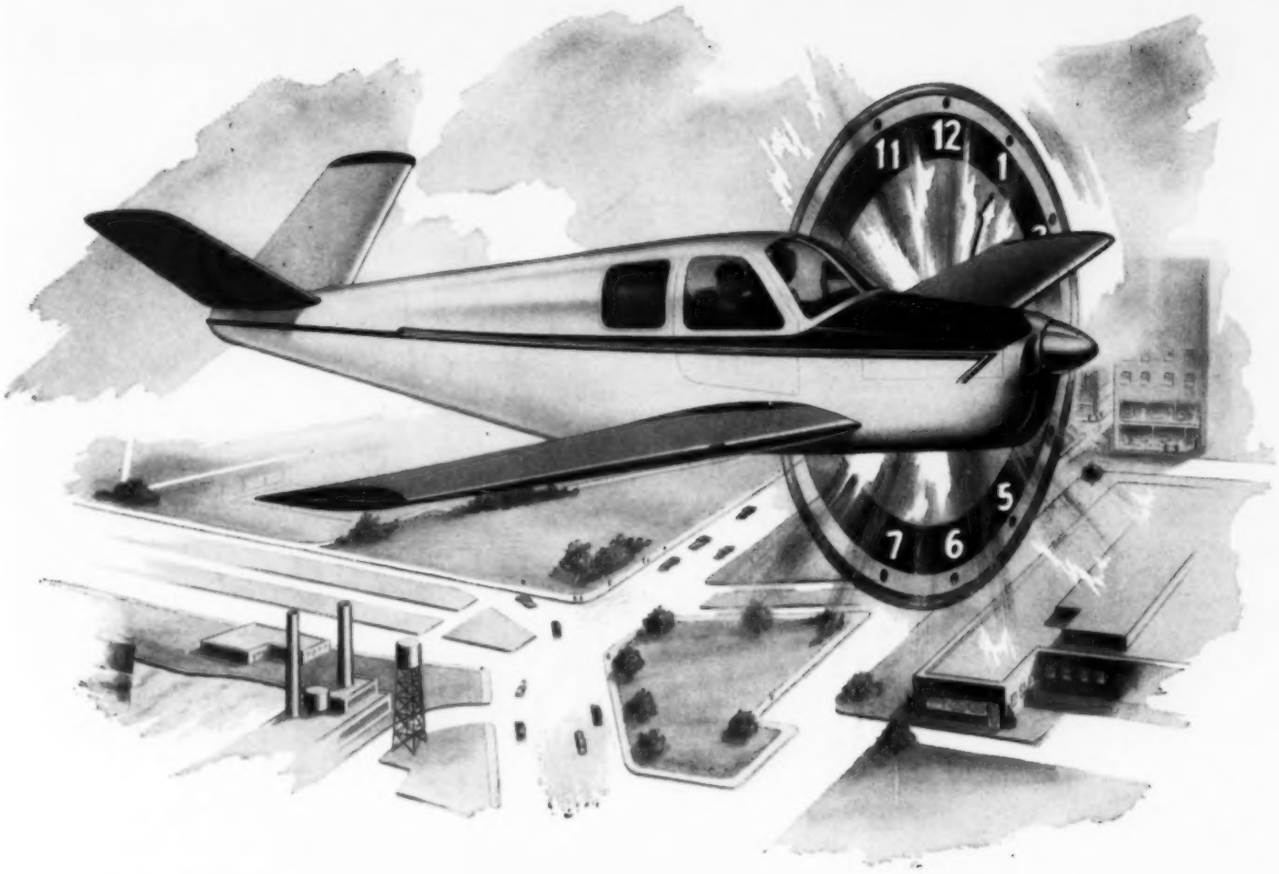
WINGS, INCORPORATED
Wings Field, Ambler, Pennsylvania
Philadelphia International Airport, Philadelphia, Pa.

To obtain the best service for your Beechcraft visit the Certified Beechcraft Service Stations listed.



Beechcrafts Help Executives Break Through the Time Barrier

Toledo, Tacoma and Tulsa – in one week – with time-consuming detail at each stop – is a pretty stiff *Time Barrier.* Beechcraft owners break through *such barriers* almost every week, still finding time for important home office function.

Policy-level buyers demand contact with policy-level sellers – the men with right answers – and authority to give them. Beechcraft *stretches* manpower – slashes travel time as much as 75 per cent. You write your own schedules and travel at your convenience.

Investigate this time-saving, fatigue-free travel today. A competent Beechcraft distributor will be glad to present the facts – or write, on your company letterhead, direct to Beech Aircraft Corporation, Wichita, Kansas, U. S. A.

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

Intended for studies of its tactical use in observation and reconnaissance, the McDonnell convertiplane features a glass-enclosed 4-place cabin. It is first U. S. military convertiplane, and is first using tip-mounted pressure jets and very high disc loading.
—(McDonnell Photo.)

McDonnell XV-1 Convertiplane

McDONNELL Aircraft Corporation at St. Louis will soon begin flight tests of its radical new XV-1 convertiplane, embodying a new concept of flight. One of several different convertiplanes under development for the U. S. Air Force and Army, it utilizes the "unloaded rotor" principle for forward flight.

In vertical flight or hovering, the helicopter rotor provides all the lift. It is powered by pressure jets, each of the three blades having a tip-mounted jet unit.

In forward flight, the rotor is unloaded and lift is transferred to stub wings so that the rotor can autorotate at its lowest drag configuration. Thrust for forward flight is provided by a pusher propeller mounted behind the fuselage. Power for the propeller is furnished by a Continental reciprocating engine, which also supplies air to rotor-tip pressure jets.

Fuel is fed to the pressure-jet tip burners through a rotor fuel governor driven from the rotor hub accessory drive. The pressure jets operate on the principle of ignition and expansion of fuel gases, exhausting rearward through nozzles to provide thrust.

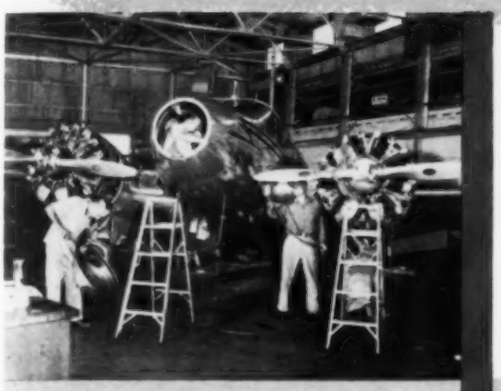
The efficient and relatively great power available from the small pressure jets allows the use of a rotor having about half the drag of a conventional helicopter rotor. Since the wings do not provide lift during take-off or landing, they are about half the size of conventional fixed-wings. Therefore speed performance of the XV-1 is not handicapped by the use of both rotor and wing. Use of unloaded rotors allows high speeds in forward flight, since it avoids the speed limitation encountered by conventional helicopters due to stalling of blades when they must carry lift at high speeds.

The McDonnell convertiplane is a 4-place craft, is about 30 ft. long, has a 26-ft. span and is 10 ft. high. It

(Continued on page 43)

Stub wings of low-drag airfoil section provide convertiplane's lift in forward flight with thrust from pusher prop driven by Continental reciprocating engine. Rotor is unloaded of lift in forward flight, auto-rotating at low-drag configuration.
—(McDonnell Photo.)

We Insist on the BEST!



The exacting standards and precise specifications established by the J. D. Reed Company is assurance of the finest in workmanship and the highest quality in materials, products and accessories.

Through our twenty-two years of service to the flying public we have insisted on perfection in every detail, whether in the work we perform or in the products we sell.

● Here at the J. D. Reed Company One-Stop Service Center we have the craftsmen and the equipment to do any job from periodic inspections to major overhauls. Further, we do the job the way you want it — promptly and dependably. All component parts are restored to original factory standards.

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● So whatever type aircraft you operate—consult the J. D. Reed Company and you will find a sincere desire to serve your requirements in the most economical manner possible without compromising on quality.

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J. D. REED CO. Inc.
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MUNICIPAL AIRPORT
HOUSTON, TEXAS

for the Solution of Your Problems

How Narco DME search and range unit can be unplugged and removed for easy servicing is shown above. Power supply unit is seen at right. Left-hand unit is "engine room"—three small electric motors to operate crystal tuning. Entire equipment weighs less than 33 lbs.

Narco DME Details

FIRST commercial deliveries of Narco distance measuring equipment (DME) were to begin in March, and in preparation for them, National Aeronautical Corporation of Ambler, Pennsylvania, has released more details of its Model UDI-1 DME.

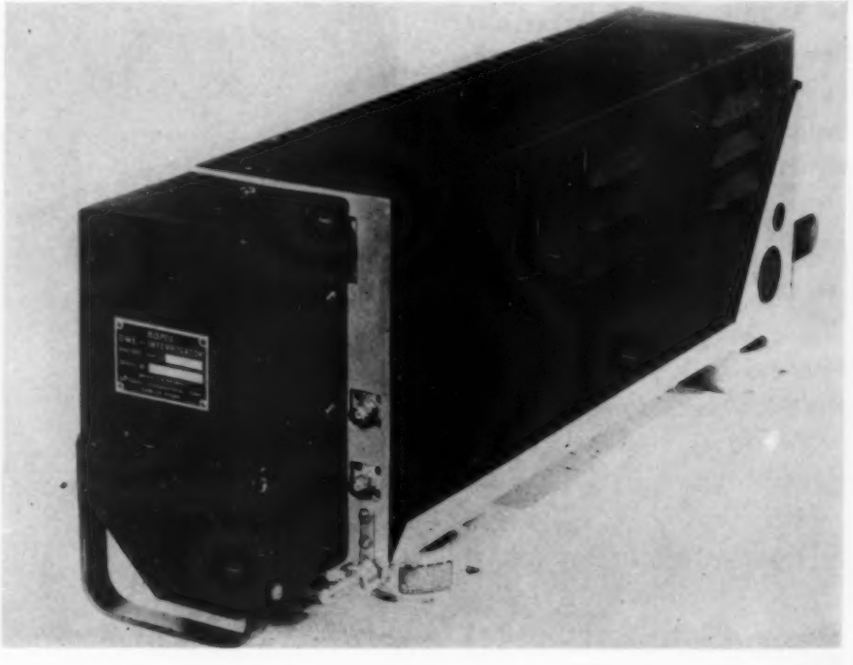
This set furnishes the pilot of an airplane a direct indication of his distance in miles from any omni-range station or any instrument landing system (ILS) equipped with DME. All 450 omnis which blanket the country are to be equipped for DME, with more than 150 already activated for DME. In addition, many ILS systems are being equipped for DME.

Narco says operation of its DME is extremely simple. After tuning the DME to the proper frequency of the omni or ILS system, the needle goes into search, sweeping slowly from zero to full range, returning quickly to zero and repeating the cycle until it receives a response from the DME station when the airplane comes within approximate line of sight of the station. Once in range, the interrogator locks on and the needle stops at the proper mileage indication. The Narco DME is said to give mileage indications at times even beyond the line of sight because of the extreme power of its transmitter, which is in excess of 500 watts, and its exceptionally high receiver sensitivity.

Distance indicated is slant distance to the station—that is, the actual distance from the airplane to the ground station. Thus if an airplane is at 5,280 ft. when passing directly over the station it will read 1 mile. Distance indication is given in two scales, the "en route" scale 0 to 200 miles or "approach scale" of 0 to 20 miles—either

(*Continued on page* 43)

Distance indicator gives mileage from station in two ranges, 0 to 200 miles for "en route" use and 0 to 20 miles for approach. Small knob marked "Range" is used to select scale. Panel-mounted frequency selector switch, shown below distance scale, operates crystal-tuned receiver of Narco DME. Photo below shows how interrogator unit mounts on standard one-half ATR rack.



AS A TRANSPORT-TRAINER FOR THE U.S. AIR FORCE, THE CONVAIR IS SETTING NEW RECORDS FOR VERSATILITY AND PERFORMANCE... ANOTHER EVIDENCE OF CONVAIR'S ENGINEERING TO THE Nth POWER

How to Get the Most Out of Your Cessna

Practically all Cessna owners today use their airplanes for the same reason — they need the most efficient and most flexible transportation available.

Hundreds of Cessna owners depend on the Authorized Cesna Service Stations listed below for their transportation needs — Authorized Cessna Service is their assurance that business planes are always ready to go, always in top condition for reliability, performance and comfort.

If you use your Cessna for important business needs, insist on Authorized Cessna Service at the Cessna Service Stations listed below. Their record for dependability and satisfaction is endorsed by the factory. Their long-established, factory-supervised Flat Rate Service guarantees every Cessna owner three important things:

1. **You get an accurately quoted price and time-required quotation based on hundreds of job studies covering virtually all your maintenance needs.**
2. **You get genuine Cessna parts and factory-trained workmanship.**
3. **You save money and time and we stand behind every job for your fullest satisfaction.**

More and more Cessna owners are recognizing the importance of these Flat Rate Service advantages.

To make the most of your Cessna's usefulness, visit the Authorized Cessna Service Stations listed below.

These progressive Cessna Authorized Service Shops offer flat-rate service.

Aircraft Sales Company
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Aviation, Inc.
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Champ's Flying Service
Municipal Airport
El Paso, Texas

Clinton Aviation Company
Stapleton Airfield
Denver, Colorado

Cruse Aviation, Inc.
Municipal Airport
Houston, Texas

Dal-Tex Aviation, Inc.
Highland Park Airport, Dallas, Texas

Hair Flying Service
Harding Field
Baton Rouge, Louisiana

Howard Aero Service, Inc.
San Antonio International Airport
San Antonio, Texas

Ragsdale Flying Service
Municipal Airport
Austin, Texas

Southwestern Skyways, Inc.
New Municipal Airport
Santa Fe, New Mexico

Kenneth Starnes Aviation Service
Adams Field; Little Rock, Arkansas

West Texas Flying Service
Midland Airport
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Yingling Aircraft, Inc.
Municipal Airport
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5-Place Utility–Single-Engine Thrift!

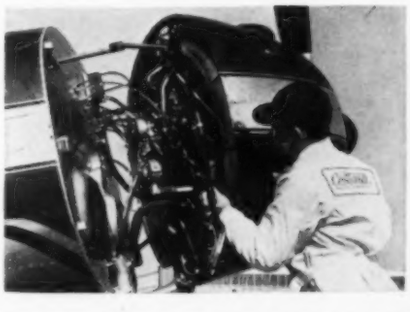
New Cessna 195 Offers Greatest Room, Luxury in Single-Engine Field . . . 12 All-New Features!

Fly it! Compare it! The one ***and only*** airplane that offers ***both*** 5-passenger convenience and single-engine economy—brilliant new Cessna 195! It's powerful! Cruises over 165 m.p.h.! Offers greater comfort than any other single-engine ship! Twelve new features including 50% increase in flap area, larger tail surfaces for easier control, smoother flight, new interior color combinations. For information, see nearest Cessna dealer (listed in yellow pages of phone book) or write CESSNA AIRCRAFT CO., DEPT. FM-4, WICHITA, KAN.

Cradled Comfort

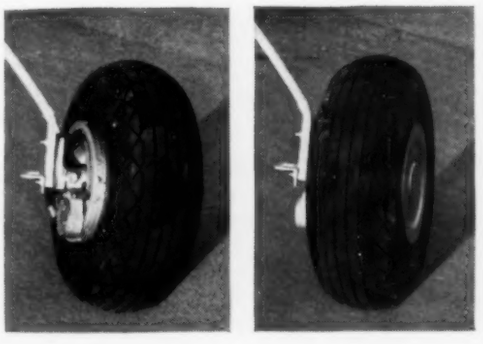
Relax in extra-soft foam rubber seats . . . stretch your legs out *full length* . . . enjoy complete comfort! Four fresh-air ventilators; a large thermostatically controlled heating system; entire cabin area is soundproofed. And for a smoother ride, you sit beneath the wing, out of the sun, with a "control tower" view of the scenery below.

Hinged Engine Saves Hours



Remove 2 bolts and the Cessna 195 engine swings out for immediate maintenance! You have a choice of two engines: a 300 H.P. Jacobs or a 275 H.P. Jacobs. Both powerful, economical, service-proved, and equipped with Dynafocal shock absorbers for smoother performance.

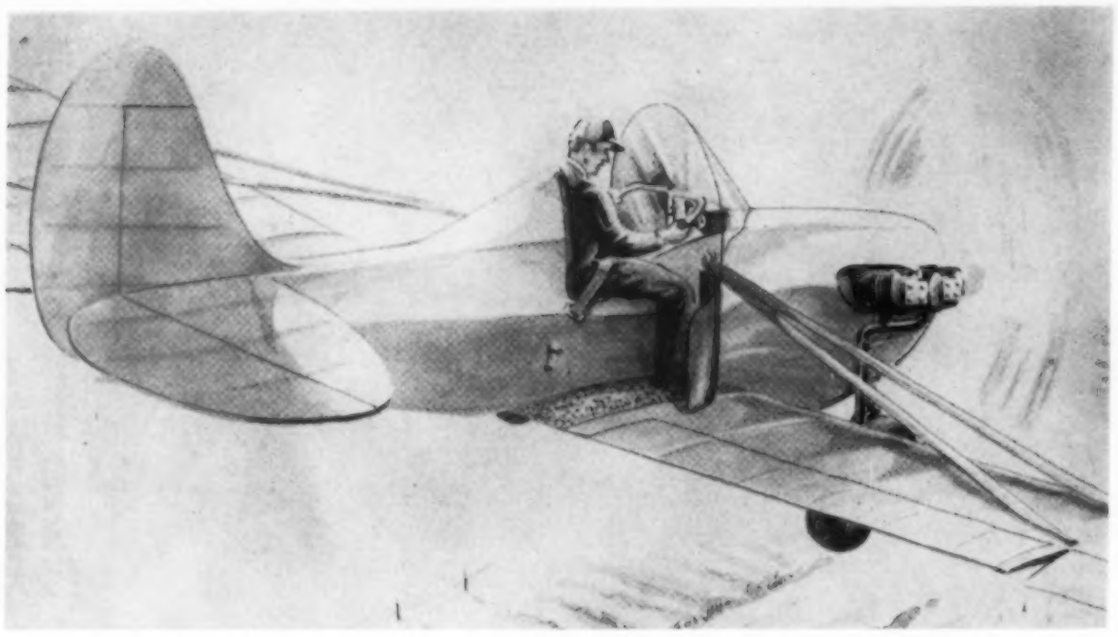
Cessna
AIRCRAFT COMPANY



Equipped with "Crosswind" Wheels

For safest, smoothest takeoffs and landings . . . standard equipment on the Cessna 195! Eliminates need for lining-up carefully on the runway during landings. Lets you take off easily, safely even when wind is at right angles to the runway!

4 GREAT CESSNAS 170 180 195 310 THE COMPLETE AIR FLEET FOR EVERY BUSINESS NEED



Sketch of Fly-Cycle in flight with handle-bars and wind guards for legs. Note trim crank.

Fly-Cycles For Farms?

Design project of a crop pilot who wants a flying saddle horse

By TOM ASHLEY

WE were sitting on a rail fence at Larry Farnham's dusting and spraying hangar on the airport at Fort Collins, Colorado, when we learned Larry's secret ambition. That's it at the top of this page.

"Go ahead and laugh," Larry said. "It's a flying motorcycle and I get quite a kick out of it myself."

"You don't ride in it—you climb up and straddle it," his wife added with a laugh.

Then we saw the handle-bars . . .

Like a lot of other dusters and sprayers we know, Larry Farnham has run the gamut of all kinds of modifications on airplanes—chopping off wings, bolting spill plates onto tips, changing leading edges, flat-topping Cubs and just about everything a crop pilot can dream up between seasons. But always he has had a special hankering.

"I've got an idea nobody has tried," he confided to us on the top rail. It was a year ago and we were in Colorado by chance. With Carl Wootten, Aero Design & Engineering Company sales manager, we were supposed to be in Ohio on a story. But sleet, snow and freezing rain had kept us out of Ohio. Instead, we took a new Aero Commander demonstrator in the exact opposite direction to Denver. Somebody had sniffed out a prospect and that's how we wound up at Fort Collins—shooting the breeze on the fence with Larry while Friend Wootten tried to sell the prospect in a hop over the Rockies.

"My idea," continued Farnham, "is that ranchers and cattlemen need some kind of flying machine they can straddle like a horse and ride like a motorcycle."

He led us out behind the hangar to a little private room. Inside we saw the start of his big idea—a welded tubular fuselage like a sawed-off Cub but with a low wing and a nose wheel. He was pretty far along but we could tell it would be quite awhile before it would fly. "Don't tell anybody about this thing," Larry asked, "because I'm not sure it will fly at all and I'd rather wait until I finish if you don't mind." We agreed and kept our promise. Last month Larry furnished us some pictures and a sketch, saying he had finished the airplane and would soon be flying it. If we were still interested, we could shoot the works, he said.

What interests us is the fact that there are a lot of Larry Farnhams around the country with a special hankering to build an airplane. More than a few have spent a lot of labor and money on their ideas, eventually flying them. Clyde Cessna was a Larry Farnham. So was Glenn L. Martin, Igor Sikorsky and others who made an industry out of a yen to fly a machine of their own. It is still an engineering industry, however, and it will not become a mass production industry until a winged equivalent of the Model T shows up in somebody's experimental shop or barn. Since fifty years of powered flight haven't brought the happy day around, such a Model T is going to require a lot of ideas in the future. How does this tinkering get under way—where does it originate? We thought of all this while Larry showed us his flying motorcycle in the making.

"Where did the handle-bars come from?" we asked.

Larry said he figured riding a bike is second nature to a youngster and

Here's Larry Farnham astride his Fly-Cycle with a good hold on the handle-bars. With 75-hp. Continental, it is expected to cruise at 85 mph., stall at 30. Big nose wheel is for rough ground.

flying ought to become the same. So why not put handle-bars on an airplane?

"You turn them the way you want to go, like on a bike," he said. "That gives rudder. You kind of lean in a turn on a bike so these handle-bars can be banked over with your turn to account for aileron. They also can be moved fore and aft for elevator action."

That way Larry has three controls —aileron, rudder and elevator—all on the same column. He emphasizes that they are not inter-connected as he believes 2-control isn't adequate. The nose wheel is steerable through the handle-bars.

"I also put the throttle on the handle-bars, using a twist-grip like a motorcycle has," he said.

Whether this will work, Larry isn't sure. He's been too busy getting ready for dusting and spraying to rush through his project. He has taxied it around the field, though, and says it feels okay on the ground. He will probably attempt to fly it before June.

There's reason for straddling the airplane instead of cooping yourself up in a cockpit, he said.

"It's like riding a horse or a bike to straddle it but it is also safer, as I figure it is better to be outside of the structure in an emergency," Larry continued.

He calls his airplane the "Fly-Cycle." It is powered by a 75-hp. Continental engine and has a 12-gal fuel tank. It has large flaps for short landings and take-offs.

Span is 30 ft., wing area is 150 sq. ft., empty weight is 650 lbs. and gross weight is 1,250 lbs. Larry estimates it should cruise at 85 mph. or so, with a 30-mph. stall speed. He doesn't intend it for cross-country travel, emphasizing it is for purely local hops as on a ranch or farm and in dusting and spraying.

He sums up the factors influencing the design as follows:

1. Need for a "flying saddle horse."

2. Bare minimum aircraft to be cheap, easy to build and fly and simple.

3. Light sprayer with ability to take spray load and pilot both in the center of gravity location (spray tanks located in the wings close to the fuselage).

4. Pilot should be on the outside of the structure for easy escape.

5. Spray material and pilot must be located as far apart as possible with fresh air flow between.

6. Simpler control system is more consistent with that used and understood on surface vehicles.

7. Pilot must be seated high for visibility.

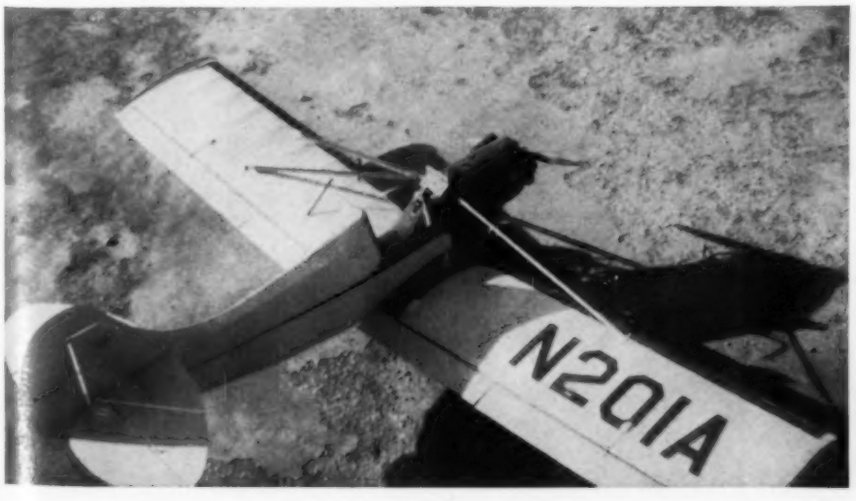
8. Eliminate non-essential weight such as doors, seats, windows, etc., because comfort is secondary in a short-range aircraft.

9. One or two-place seating without extra seat or space and without change in center of gravity.

10. Tricycle landing gear with short turning radius and with large, 8-in. nose wheel for rough ground.

Farnham, who is president of the Colorado Aerial Applicators Association, has operated at Fort Collins since 1948. Before that he operated in Iowa and was formerly with the Civil Aeronautics Administration in the War Training Service as an aircraft maintenance supervisor.

He is having a lot of fun with his Fly-Cycle even before it flies and it has created a lot of interest among operators and ranchers who have seen it. However, he has no grandiose ideas about going into production. "It might be the biggest flop anybody ever fooled with—it might never get off the ground," he laughed. We had to join in, for now we have seen everything. What's more, we figure it'll fly, and we expect to go back to Fort Collins when it does. ★ ★ ★



Fuselage narrow enough to straddle is shown in this view of the Fly-Cycle. This picture was made before the fourth wing strut had been bolted into place. Thirty-foot wing has 150 sq. ft. of area. The craft grosses a hefty 1,250 lbs.—"I built it pretty sturdy," Larry said.

ECONOMY, SAFETY, COMFORT and PERFORMANCE...

a PIPER tradition

Throughout the years all Piper models have excelled in the true Piper tradition of **economy, safety, comfort and performance.** The widespread public preference for these outstanding qualities is evidenced by the fact that in 18 out of the last 20 years Piper has led in personal aircraft sales.

Today's Pipers with their speed, range and utility continue to fulfill the Piper pledge to give the Piper owner more for his flying dollar.

• Ask one of the firms listed to demonstrate how one of the Piper models can save you valuable time and money. These firms are prepared to serve all your aircraft requirements.

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Texas

BROWN FLYING SERVICE
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San Antonio

JACK ROBINSON FLYING SCHOOL
Meacham Field
Fort Worth, Texas

SOUTHWEST AIR RANGERS
International Airport
El Paso, Texas Midland, Texas

PIPER CROP MODEL

(Continued from page 24)

additional nozzles for high density application at rates up to 15 gals. per acre. This increased pump and spray-boom capacity was formerly available only at extra cost.

Improved flow of dry chemicals is also provided in the new model, which is convertible for dry or liquid application. When dust is used, tank baffles can be quickly removed for unobstructed downward flow of the chemicals to the agitator. This flow is further improved by a large forward-facing air scoop which directs a blast of air downward and prevents dust from remaining banked up on the sides of the hopper. ★ ★ ★

NEW JET TRAINER

(Continued from page 19)

position it occupied on the T-33 trainer and the stabilizer span is 12 inches greater.

Both cockpits have been completely redesigned from the T-33 to afford more space and improved instrumentation. They feature duplicate instrument panels, dual flight controls and automatic seat ejection. The trainer's advanced navigational equipment includes a new glide path receiver, localizer VOR receiver which replaces the radio compass, and Zero Reader. ★ ★ ★

BIGGER ENGINES, BETTER DC-3 says Chief Pilot Harvey Glass of Texas-Illinois Natural Gas Pipeline Co. about DC-3 conversion to Pratt & Whitney R-2000 engines used previously by DC-4. Conversion was made by Northwestern Aeronautical Co., Holman Airport, St. Paul, Minn. Bigger engines boost DC-3 power by 250 hp. each for increased single-engine performance and better take-offs from small fields along the Texas-Chicago pipeline. Northwestern Aeronautical is Pratt & Whitney authorized sales and service station and used engineering from Pan-American World Airways in converting the executive DC-3 to R-2000's.

PICK the PIPER Tri-Pacer for FLYING EASE

PICK PIPER FOR COMFORT, TOO. There's new comfort, new interior beauty in the 1954 Tri-Pacer. Foam rubber seats, generous sound-proofing mean relaxed, quiet flight. Five individually controlled air vents, double cabin heaters (front and rear), windshield defrosters add to cabin comfort. More than ever, the Tri-Pacer is aviation's outstanding value.

The Piper Tri-Pacer is the easiest airplane to fly that's available today. With its tricycle landing gear, take-offs and landings are virtually automatic. Its rudder and ailerons are inter-connected to eliminate the need for coordination. It is so easy to fly a number of people have soloed after only one day of instruction—several after less than three hours!

Its flying ease is translated into comfort and safety, too. In rough air it is noted for its solid, big-airplane feel. Its stability and stall-resistance are so perfected that one leading editor and authority on personal airplanes wrote: the Tri-Pacer is "as stall- and spin-resistant as they come."

Yet for all its superb flying ease, stability and safety, the Tri-Pacer is an efficient, cross-country airplane, with over 120 mph cruising speed and over 575 mile range. And you get all this for nearly $2,000 less than any other four-passenger plane—for less than half the price of any other with tricycle landing gear. Little wonder the Tri-Pacer leads all others in sales.

See it, fly it today. You'll pick Piper.

TAKE A DEMONSTRATION FLIGHT in the handsome new 1954 Tri-Pacer and see for yourself the amazing flying ease, comfort and performance. Check these important features, too—tough, resilient, easy-to-repair Duraclad finish, beautiful two-tone styling, dependable Lycoming power, flaps for short field use, separate front and rear doors, "flight-planned" panel with room for full radio and instrumentation. Send today for full-color brochure.

Pick PIPER

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PIPER AIRCRAFT CORP.

Lock Haven, Pennsylvania

2 good reasons why NARCO LEADS in Omni Sales

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Finest single-unit Omni system available. Exceptionally accurate. Also operates on ILS localizer and VAR. 8-channel transmitter; 108-127 mc receiver plus 75 mc marker beacon.

SUPERHOMER

Most popular Omni system—4-channel transmitter, 108-127 mc receiver, plus vernier course selector. Only 10½ pounds. A remarkable, low-cost navigation and communications package.

Compact, self-contained and packed with performance—that's why these two great Narco Omni sets are found in more business, farm and personal planes than all other Omnis combined! In one, single compact unit only Narco gives you a complete navigation and communications package—crystal-clear VHF reception and multi-channel transmission plus Omni navigation for cross-country flying ease.

Narco outsells other Omnis for general flying because:

1. ***Narco gives top performance, transmitting power, exceptional accuracy "to" and "from" Omni stations.***
2. ***Narco equipment is rugged, gives long-lasting service.***
3. ***Narco has concentrated its development strictly on VHF navigation and communications equipment.***

narco NATIONAL AERONAUTICAL CORP. *Ambler • Pennsylvania*

ALSO THE SIMPLEXER—12-channel VHF transmitter and receiver with famed Narco "whistle-stop" tuning to give you that auxiliary communications equipment and extra channels to simplify radio operations.

AIR REPORT

(Continued from page 8)

Demonstrations by the Bendix Twin Beech equipped with DME during March include the following locations: Atlanta, Miami, Rochester, Dayton, St. Louis, Houston, Shreveport, Oklahoma City, New Orleans, Los Angeles, San Francisco, Denver and Seattle. . . . **A 5-DAY DME INSTALLATION AND MAINTENANCE COURSE FOR BENDIX DISTRIBUTORS** was conducted in February at Baltimore, with the following Bendix distributors represented: Remmert Werner, St. Louis; Aerodex, Inc., Miami; Reading Aviation, Reading; Atlantic Aviation, Wilmington and Teterboro; Qualitron, Inc., Burbank, and Bayaire Avionics, Oakland.

HANDY GROUND ELEVATION INDICATOR has been marketed by Jarico & Associates, 101 Crawford St., Danville, Ill., at $3.50 each. It is a small plastic, transparent dial mounted on a rubber washer which is cemented to the glass face of any sensitive altimeter. Before take-off, the pilot sets the indicator's "0" to the field elevation. En route, he resets the "0" to the elevation of the field at his destination. This gives him a ready reference to his above-ground elevation. The idea was developed by James H. Coffing, flying businessman at Danville.

ASSOCIATED AVIATION UNDERWRITERS has again broadened its airline trip insurance by reducing its rate 20 per cent and increasing its limit from $50,000 to $62,500, with corresponding increases in medical payments provided with each unit. The new rate applies at Associated's 11 insurance counters at airports as well as through its machines in 250 cities in this country, Canada, Alaska and Hawaii.

"SCINTILLA DIVISION" is the new name of the Scintilla Magneto division of Bendix Aviation Corp. The word "magneto" was dropped because it is no longer descriptive of the size and scope of the division's operations, which includes manufacture of ignition systems, ignition analyzers, noise filters, harness, connectors, booster coils, switches, fuel injection equipment, magnetos and small engines.

CAA COMMUNICATIONS STATIONS AND TOWERS will discontinue their receiving watch on 3105 kilocycles on March 15, maintaining a watch instead on 3023.5 kilocycles. Aircraft owners should have their transmitters converted to the new frequency.

SCHWEIZER AIRCRAFT CORPORATION at Elmira, N. Y., is completing a 30 per cent plant expansion necessitated by increased production of its own projects and contact work.

Airmen's Calendar

April 12-14—Airport Operators Council 7th Annual Meeting, Tampa, Fla.

April 12-15—SAE Aeronautic Meeting, Production Meeting and Display, Statler Hotel, New York.

April 21-24—2nd Annual Student Paper Competition, Sponsored by Texas Section, Institute of Aeronautical Sciences, Adolphus Hotel, Dallas, Texas.

May 5-7—Third International Aviation Trade Show, 71st Regiment Armory, New York.

May 16-19—American Association of Airport Executives Convention, Louisville, Ky.

June 5—Second Annual Transcontinental Air Cruise, Philadelphia to Palm Springs, sponsored by Philadelphia Junior Chamber of Commerce.

Builders of sailplanes and gliders for nearly 20 years, Schweizer also produces numerous parts and components for Republic Thunderstreak fighters and other aircraft. It recently received a new million-dollar contract for fuselage section from Republic. Other firms for which it produces parts include Bell, Fairchild, Grumman, Link, and Kaman.

COMMERCIAL SALES OF A RADICAL NEW NICKEL CADMIUM BATTERY FOR AIRCRAFT are planned by the Sonotone Corp., manufacturer of hearing aids and electronic equipment. The firm has been producing the battery four years for the military, turning out over 600,000 units. Half the size of an ordinary battery, the new unit is said to have five times the life expectancy of ordinary batteries. It also charges with phenomenal rapidity, and can deliver very large currents in proportion to its size. It uses an alkaline solution instead of acid and requires but a few drops of water a year.

DEVELOPMENT OF A SUPERSONIC MACHMETER for high-speed flight research has been announced by Kollsman Instrument Corp. Covering a range of 0.7 to 3.0, or up to 3 times the speed of sound, it has been important to recent record-breaking flights including that by Major Charles Yeager in the Bell X-1A which clocked 1,650 mph. at an altitude of 80,000 ft.

A NEW ANTI-STATIC SOLUTION, Anstac 2-M, has been perfected by Chemical Development Corp., and is useful in eliminating static charges on aircraft canopies and windows. These plastic surfaces accumulate tremendous static charges which are the main cause of dust and dirt attraction, this in turn causing scratches on the surfaces. Wiped on with a cloth, the solution cleans the surface and prevents static build-up for long periods. ★ ★ ★

An Invitation To

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You may well be one of a select group of men intently interested in developing tomorrow's jet fighters . . . special reconnaisance aircraft . . . jet bombers and transports. The Aircraft Division of Fairchild offers a genuine creative opportunity to such men.

New concepts of flight for the jet era . . . as well as engineering advances on the world-renowned C-119 Flying Boxcar and soon-to-be-produced C-123 Assault Transport are coming from Fairchild. Diversified, stimulating assignments like these increase the inventive challenge to Fairchild's team of qualified aerodynamicists.

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FAIRCHILD

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Engine Analyzer

How much did your last schedule delay cost? How much in time, with idle men and equipment? How much shop overtime . . . lost revenue?

The Land-Air Engine Analyzer can reduce delays—and losses—to a minimum, by analyzing vibration or ignition difficulties *before* they turn into schedule delays.

And . . . you'll find the Land-Air Engine Analyzer has the lowest price tag of any similar equipment on the market. It is an instrument that will give you complete, dependable engine analysis—*vibration* or *ignition*—whether used as a portable unit, or airborne.

***It will pay for itself* in materials, time and labor saved.**

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201 NORTH WELLS ST., CHICAGO 6, ILL.

MAKING DISCOUNTS COUNT

(Continued from page 22)

port picture that exists today throughout most of the country.

Let me cite the example of a single operator — and what the parts and accessories business means to him. This operator is "small" — he runs a small sod field and does a modest flying business. For the past several years this operator has, however, sold an average of two pieces of lightplane electronic equipment every month. At an average commission to him of $250 per item, his income annually from this source alone is $6,000 — six thousand dollars that must come under the heading of "plus profits." At his own field he doesn't do the volume of business represented by radio purchases on this scale. Being a progressive operator — and knowing the potential in accessories sales — he must be taking business away from others in his area who lack the gumption to go out and get it.

What's more — and this is very important — he doesn't dig up the business and then turn around and give his profits away. Hard though it is to believe, you'll find that a great many of the operators who shrug off parts and accessories as a "minor" source of income refuse to make their own legitimate profit when they do make a sale.

Like the automobile dealers in their early heyday, these operators have yet to recognize that the discount allowed them by the manufacturer of "extra" items is a standard, wholly respectable and altogether legitimate return for their part in the selling transaction. Operators who would turn pale at the thought of relinquishing their own commission on the sale of an aircraft or a tankful of gas, will cheerfully turn around and offer the same customer a radio "at wholesale." Argue with him about it and he'll more than likely come back with: "Oh, I sold him the airplane, I can afford to give him my discount on the radio."

As I see it, he couldn't be "wronger." The manufacturer and the distributor both guarantee to that operator a fair margin of profit on every item he sells. They protect this commission for him, and won't cut him out of it, ever. They guarantee him this fair profit because he's entitled to it — and it makes very little sense for him to turn around and give it away.

To make my point clearer, let's consider for a moment that an airport operation is a pie. Now, to have a complete pie you have to have all of the pieces — and, similarly, to have a complete, well-rounded airport operation business, you have to have all the

income from the various activities, or pieces.

The pieces are of different sizes, true, but all are important to successful operation — aircraft sales, flight instruction, service, gas and oil, charter and air taxi flights, *and* sales of parts and accessories.

Without that last piece, it's an incomplete pie. And when that particular juicy slice adds up to 12 per cent of the operator's total income — as our survey discloses — it can well mean the difference between profit and loss for his over-all operation at the end of the year.

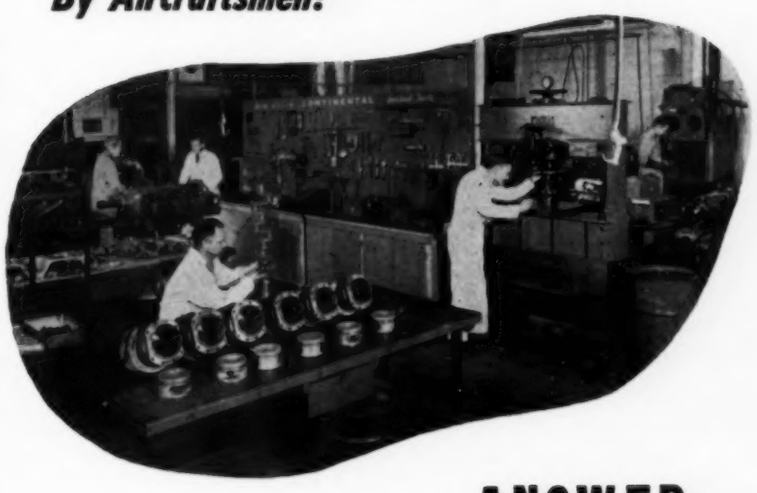
Incidentally, I'm of the opinion that the 12 per cent figure, while it doubtless represents a fair *average* of the operators questioned, is by no means indicative of the percentage of profit from parts sales which a livewire operator can hope to realize. The sales are there, to be made. The operator who recognizes the sale of parts and accessories for the essential part of his business that it is, will do a heavy volume of business here. The operator who is indifferent to this avenue of profit — or who casually gives away the revenue he can legitimately expect here — will obviously find parts and accessories making a poor showing on his year-end ledger.

What I'm getting at is this — the operator crediting the greater percentage of his business to the sale of parts and accessories is merely showing the other operators what they're missing. The profit potential is there for all to realize. But, it can *never* be realized by the operator who fails to make his discount count. ★ ★ ★

FOR MAKING MORE BEECHCRAFT SALES THAN MEN in 1953, Mrs. Evelyn (Pinky) Brier is shown receiving a television set given by Norman Larson, Southern California-Nevada Beech distributor. Co-owner of Tri-City Airport in San Bernardino, Mrs. Brier won the award for sales over four other Larson dealers — all of them men.

QUESTION:

Why Are More and More Executive Owners Insisting on a Continental Overhaul By Aircraftsmen?



ANSWER:

Finest Facilities... Aircraftsmen, Inc., offers one of the most complete official Continental overhaul shops in the nation at Hangar 2 on Will Rogers Field, Oklahoma City.

Men With 'Know-How'... Men like Larry Reed, left, our engine shop superintendent. He has over 27 years of engine overhaul experience to his credit, nearly half of it as field service engineer for the Continental factory. Continental owners, who want the best and will accept no compromise, demand real "know-how" when overhaul time rolls around.

THAT'S WHY more and more busy executive owners bring their Continentals to the Aircraftsmen repair station, fully approved by CAA for overhaul of **all** series Continental aircraft engines.

Let us figure your next job. The best actually costs less!

Aircraftsmen, Inc., is also one of the leading Lear distributors, with one of the finest radio shops in the Southwest, specializing in Auto-Pilot and complete Lear installations.

BEECH OWNERS: Write for descriptive literature of our specially designed extra tanks, map and thermos cases, curtains and visors.

Aircraftsmen Inc.

CAA APPROVED REPAIR STATION 289

P. O. Box 2516 • MElrose 8-6338 • Will Rogers Field • Okla. City

New Aircraft Radio Service For Executive Planes, Airlines

A NEW and elaborately-equipped aircraft radio sales and service facility has been opened by Dallas Avionics, Inc., at Love Field in Dallas. In addition to its specialized aircraft navigation and communications equipment installation, maintenance and sales service, the new firm also operates as Bendix radio distributor for Texas, Oklahoma, Arkansas and Louisiana.

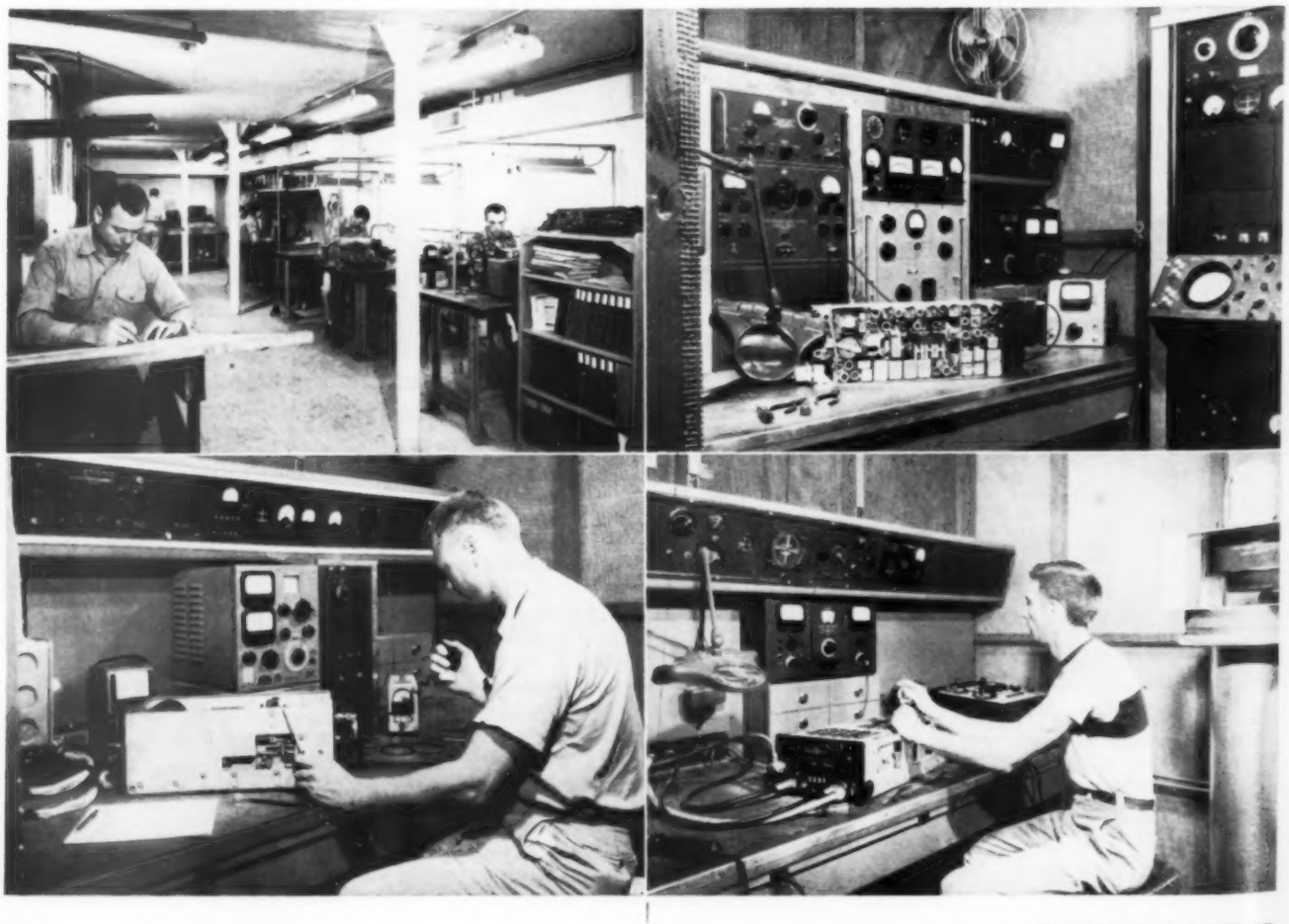
William D. Price, Jr., communications chief for Pioneer Air Lines and other air carriers, is president of the new establishment. It is located on the Dallas Aero Service ramp and its air-conditioned quarters include three individually-screened test-rooms for all types of equipment. One is for VHF navigation systems and ILS equipment, a second is for communications equipment and a third is for ADF and low-frequency navigation equipment. Price said his firm has 24 pieces of special shop test equipment which make it one of the most complete available to aircraft owners and operators. Dallas Avionics has CAA certificate No. 3656 for Radio Class 1 and 2, without limitations.

Fifteen communications technicians, having over 75 years of combined experience in aviation communications and electronics, make up the Dallas Avionics staff. Jack Gailey is production manager and R. W. Johnson is chief inspector.

Before joining Pioneer Air Lines in 1947, Price had supervised communications for Mid-Continent Airlines, All American Aviation (which became Allegheny Airlines) and China National Aviation Corporation (CNAC) in the Orient, and had served with Bendix Radio as field service and sales engineer. Most of his staff have completed special factory courses at Baltimore, Maryland, in Bendix radio installation, service, overhaul and sales.

The firm has made arrangements with Dallas Aero Service for sheet metal, airframe modification and weight and balance services for aircraft serviced by Dallas Avionics. It will soon appoint Bendix radio dealers throughout the 4-state territory for which it is the authorized Bendix distributor. ★ ★ ★

Dallas Avionics, Inc., is located on Love Field in the main building of Dallas Aero Service (right). Its general shop is shown at left below, with its screened room for testing omni and ILS equipment pictured at right below. The two bottom photos show the screened laboratory for communications equipment (left) and a screened room for testing ADF and low-frequency navigation equipment (right).
—(Dallas Avionics Photos.)



XV-1 CONVERTIPLANE

(Continued from page 28)

has twin tail booms with vertical fins and rudders on each boom and a single stabilizer mounted between the ends of the booms. Without wheels, it has a skid gear which differs from conventional helicopter skids in that energy is absorbed during hard landing by the yielding of replaceable stainless steel straps.

Details of military convertiplanes have been shrouded in secrecy during their development. The McDonnell XV-1 is the first to be rolled out and will probably be the first to fly. The second will probably be a project under development by Bell Aircraft at Fort Worth. It uses the "tilting rotor" principle. ★ ★ ★

NARCO DME DETAILS

(Continued from page 30)

being selected by a knob on the face of the panel indicator.

Biggest feature of the Narco is its crystal control. Crystal tuning has been used in radio receivers for years, but problems for its adaptation to DME led many to believe it impossible of achievement. However, Narco perfected it as an essential for accuracy in long-range, low-altitude tuning and its DME is the only one available with crystal tuning. This eliminates complicated frequency alignment procedures to greatly reduce and simplify maintenance. The tuning control is a standard panel-mounted crystal tuner with numbers indicating the frequency desired. If an aircraft is already equipped with such a frequency selector, the same switch can be used for both VHF receiver and DME.

The main interrogator unit of the Narco DME employs a number of unique electronic techniques and advanced circuitry to reduce the size and weight of the unit and to permit mounting on a standard one-half ATR rack. It employs printed wiring and many other weight and space-saving techniques, using ruggedized ARINC-standard tubes.

The unit has been designed for unitized production, there being five major units which can be rapidly unplugged one from the other. These consist of receiver, transmitter, range unit, power supply and automatic channel selector.

Even before commencing deliveries, Narco has established a network of service centers which are installing expensive test equipment now. Narco is also training service representatives from these centers. Service stations will stock replacement units. ★ ★ ★

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DELIVERY **TODAY** — In our own hangars for your immediate inspection

Super 92 DC-3

All extra large windows
3 picture 15 x 60
10 cabin 15 x 18

New ship guarantee, complete 8,000-hour overhaul, Super-92 engines, Collins radio, beautiful custom interior, 200 miles per hour. Today's finest executive air transportation. Exterior paint color and design to your own preference.

Other **DC-3**
Special Wright Powered Executive . . . . $ 88,000
Compartmented R1830-94 Executive 150,000

MALLARD

Complete Executive Interior
Janitrol Heat, Ship-shore phone, etc.
Complete Executive radio
Omni VHF ILS ADF MHF LF
Traded on Super-92 DC-3

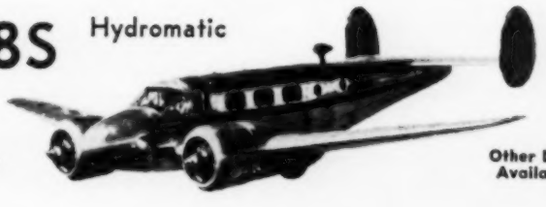
Other Mallard Available

DOVE

Autopilot
VHF, Omni, ADF, ILS, LF
Executive Interior
Traded on Super-92 DC-3

Other Dove Available

D18S Hydromatic



NTSO, Relicense
VHF, VOR, ADF, etc.
Bendix Autopilot
Traded on Super-92 DC-3

Other D18S Available

BONANZAS

New, Demonstrators
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Also

TWIN-BONANZA Fully Equipped Autopilot, VHF, Omni, ADF

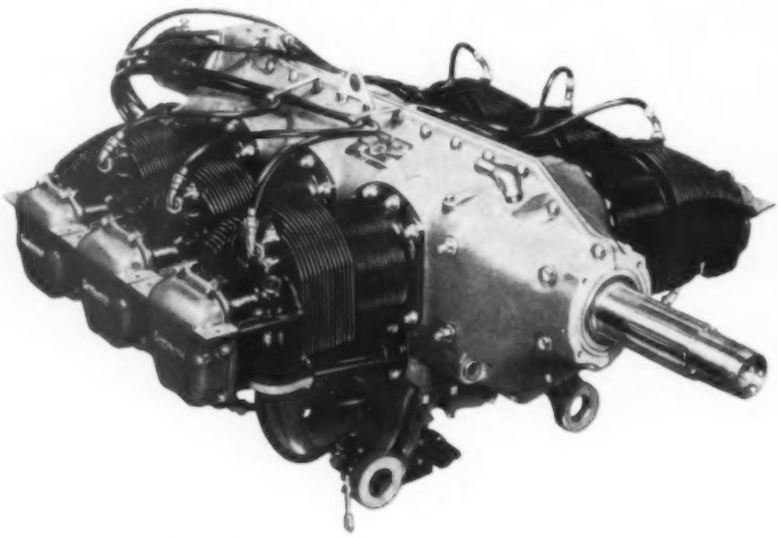
PV-1 Deluxe interior and equipment Collins radio, Sperry Gyrosyn, etc.

LODESTAR Executive interior and equipment Traded on Super-92 DC-3

First deposits take — Write, wire, or call — Today

Lambert Field **REMMERT-WERNER, Inc.** St. Louis, Mo. CAbany 5425

Continental E225-8 in Bonanza



CONTINENTAL Motors has released the following data on its E225-8 6-cylinder engine which powers the 225-hp. version of Beech Aircraft Corporation's new 1954 Model E35 Bonanza:

Type Certificate	267
Number of cylinders	6
Bore (inches)	5
Stroke (inches)	4
Displacement (cu. in.)	471
Ignition	Dual
Type prop drive	Direct
Compression ratio	7.0-1
Rated power (sea level)	225
Take-off power (sea level)	225
R.P.M. at rated power	2650
Rec. fuel (min. octane)	80/87
Dry weight*	437
Shipping weight	460
Crankshaft rotation	Clockwise
Dimensions with standard equipment installed:	
Length	48.96
Width	33.39
Height	21.66
Spark Plugs	Champion
Carburetor	Stromberg
Magnetos	Scintilla
Starter	Eclipse
Generator	Delco-Remy
Voltage Regulator	Delco-Remy
Radio Shielding	Continental

*Without generator, starter or fuel pump.

CONTINENTAL'S NEW SIX

(Continued from page 18)

in height. An important factor in overall length is the new propeller mount. Continental is pioneering a 5⅜-inch metal flange, replacing the wider and bulkier flange required by wood propellers. The new flange is designed for use with constant-speed metal propeller of simplified design which can be mounted directly on the crankshaft and operated by governor control oil through the shaft.

Servicing is simplified by the provision of automotive type hydraulic valve lifters, in combination with a camshaft of improved design. These lifters permit access to the valves.

★ ★ ★

CONTROL FOR CYLINDERS

(Continued from page 21)

chromium (approximately 1000 Brinell) exceeds that of any other metal for barrel manufacture, thus the presence of abrasives in the processed barrel is much less critical than in the raw steel barrel. This feature alone was responsible for the incorporation of porous chromium plated cylinder barrels in the radial engines of the tanks that were the deciding factor in the North African campaign. Prior to the advent of the porous-chromium plated barrel, sands of the desert had acted to render engines useless in tanks.

In addition to these factors, other characteristics of porous chromium that promote increased barrel life are:

1. Corrosion resistance, which eliminates surface deterioration from the action of the products of combustion and prevents oxidation (rusting) of

the barrel bores of low time engines in storage.

2. High thermal conductivity (faster than through unprocessed barrels), which accelerates the transfer of heat from barrel to fins, thereby reducing head temperatures that are accountable for ultimate head fatigue.

3. High melting point (3325 degrees Fahrenheit, plus), which prevents welding of piston to barrel.

These three qualities, in addition to extreme hardness and low coefficient of friction, are characteristic of any plated chromium surface, but the use of dense (non-porous) chromium for a bearing surface is not advisable, since dense chromium has extremely low wettability, and therefore does not promote adequate lubrication.

To account for this important difference between porous chromium and dense chromium it is first necessary to understand a bit of the chemistry of electroplating. Electrodeposited chromium has a tendency to check minutely at the surface. These checks are referred to as stress patterns, and temperatures maintained in the plating process affect the depth and breadth of these checks to a limited degree. Once the stress pattern has been established, a reversal of the current flow in the plating process can be utilized to enlarge the fissures of the stress pattern and to eliminate existing stresses.

By a process of selective etching, electronically controlled, that removes chromium—not in even layers, but by a further erosion of existing stress patterns—pores or channels can be formed on the surface of the chromium to create a porous surface of high wettability. The controls used in the process are so sensitive that the depth and breadth of the pores or channels can be accurately determined. This "engineered erosion" can be controlled to range from 20 to 50 per cent of the total surface area of a plated cylinder barrel.

The application of porous chromium to cylinder barrels is not confined to military aircraft—CAA approval of the Van der Horst process was given in October, 1945, and only an accelerated air defense program has prevented more extensive use in commercial and private operations.

Today, the Aircraft Division of the Van der Horst Corporation with expanded facilities in Olean, N. Y., Terrell, Texas, and Los Angeles, Calif. (Spar-Tan Engineering, West Coast licensee), has geared itself to meet the demands of all aircraft operators.

★ ★ ★

SPIRAL STABILITY

(Continued from page 17)

first hour's demonstration is the fact that we hope to put one on our new 170. We're convinced this determined young man with a plan is going to have a hard time filling orders when he gets his Javelin approved for all the makes and models of lightplanes now flying.

★ ★ ★

FIRST FLIGHT PHOTO OF NAVY'S NEW F3H-1N DEMON PRODUCTION MODEL was made recently at Lambert-St. Louis Municipal Airport where it is manufactured by McDonnell Aircraft Corp. An experimental model has undergone exhaustive flight tests and carrier qualification trials. —(McDonnell Photo.)

CAA AVIATION DEVELOPMENT ADVISORY COMMITTEE recently conferred with CAA Administrator Fred Lee. Standing, left to right, are J. D. Ramsey, Nebraska Aero Commission director; Ralph E. Piper, Monsanto Chemical chief pilot; Merrill C. Meigs, Hearst Publishing Co.; Charles Rose, Arkansas cotton ginner; L. S. White, White Wright Co., Portland, Ore.; Frank W. Beer, Phoenix attorney, and Joseph D. Blatt, assistant CAA administrator. Seated, left to right, are J. C. Bennett, Louisville Flying Service; Norm Larson, Burbank Beech distributor; Administrator Lee; George Jalonick, Southwest Airmotive; and Wiley R. Wright, CAA staff.

Questions and Answers for Airport Operators

Stock Controls

QUESTION: **My shop foreman wants me to put in a book inventory control on my parts department. In the past, I have operated with periodic physical inventories and when monetary values were necessary for profit and loss purposes, I have priced items from invoices. But I have nursed our shop business along until it's getting to be a big factor in my over-all income. I hesitate, however, to set up an elaborate bookkeeping system with its attendant costs which can soon eat into the margin of profit on parts to the point I can't justify. What do you think about it?**

ANSWER: There usually comes a time when a growing shop and parts business reaches a point where such controls have a greater value to you than the cost involved in maintaining them. The small stock room of a small operation, if orderly and well arranged, can at visual reference give you a quick picture of your purchase needs for replenishment. This is satisfactory if you or your mechanic has a good enough memory to determine the approximate rate of use or sale of parts in order that you may re-order in the quantities you will need for a reasonable period. Then a physical inventory will normally suffice, despite the fact you are likely to be out of something you need frequently because of the failure of human memory.

We remember a little old lady in Missouri who ran a small general store. She minimized her inventory expense. On New Year's Eve she threw a twenty dollar bill on the floor and said that's what she started off the year with so all the stock on her shelves was profit. Hardly a workmanlike inventory, but she was satisfied.

The greatest dangers in maintaining a stock of parts lie in the following factors:

1. Items out of stock which are needed regularly.
2. Items in stock either in quantities far above needs or items so dead they do not move.
3. Total investment or unbalanced investment which shows up in low rate of turnover.

The busy shop doing a volume business requiring parts, instruments and accessories needs the kind of control which will give to management these things:

1. Quantities on hand at a given physical inventory date.
2. Quantities purchased.
3. Net unit prices by quantities in stock and purchased — and selling price per unit.
4. Units sold or used by date. This is a necessity if control is to be exercised. If a part in stock sells at a rate of 6 a month you don't need a gross in stock unless it is in the category of small, low-cost items you are warranted in buying by the gross because of minimum packaging or savings.

In convenient form, such a record is designed to localize all information on one card, sheet or form for each item

24 LEADING WORLD AIRLINES HAVE SELECTED TURBO COMPOUNDS
PAKISTAN INTERNATIONAL AIRLINES
selects TURBO COMPOUNDS
for fast Karachi-London service with
LOCKHEED Super CONSTELLATIONS
World's Finest Aircraft Engines
CURTISS-WRIGHT
CORPORATION • WOOD-RIDGE, N. J.

of stock, indexed for quick use either by name or number and grouped to suit the needs of the operation — that is, by class or type. Each record should be arranged to show balance on hand. Physical inventories periodically are still required and entered in order to reveal discrepancies. These may be just errors in record keeping or they may reveal inventory losses of some magnitude.

The maintenance of such a record in its most useful form requires that each order placed be entered as a quantity on order and when received be recorded as in stock and removed from "on order" status. At the same time, the net unit price for the quantity received should be entered. When pricing an actual physical inventory, this is especially useful if you price at cost (some businesses price inventories at selling and use an average markup to arrive at cost). For example, if you have 27 each of an item in stock and this quantity consists of 3 items acquired at a cost of $15 each and a new order received 2 dozen at $17 each, you would price 24 at $17 and 3 at $15. If you had 4 of another item and had 3 purchases made in a year at these successive prices — 6 at $27, 6 at $28 and 6 at $30 — you would consider that the 3 on hand had cost you $30 each. This is the accurate method of pricing inventories.

Now we know all this record keeping is work and work costs money. But you asked us what we thought. Here is what a sound book inventory control will do for you:

1. Periodic run-through will enable your stock man to determine quantities by item to be ordered. The quantity on hand when considered against the rate of use or sale as revealed by dates and quantities used or sold will tell you your average needs. The difference between dates of order and receipt will show how long it takes to get the item into stock. If you can get an item in two days you can let your stock run lower than if it took two months. You can keep quantities within decent limits of turnover to hold inventory investment down. Reorder procedure should not be mechanical. Seasonal changes in demand should be anticipated. Coming maintenance contracts may add to quantities to be ordered.

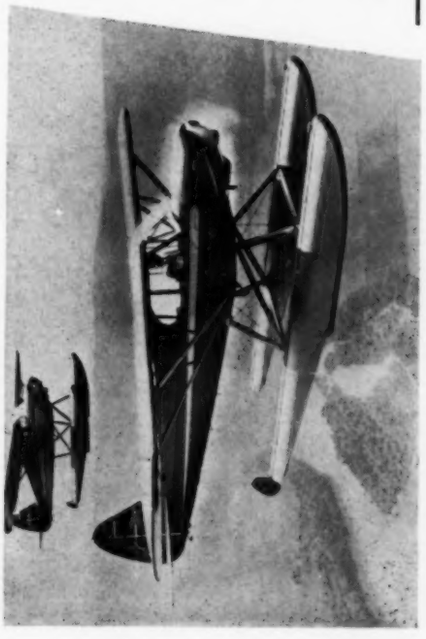
2. Periodic run-through will signal overstocks. Every parts inventory will include items so slow-moving you would be better off if stocks were reduced or eliminated entirely. It is better on many of them to take a minimum loss by selling at cost or below than to let them accumulate dust. Every $1,000 of inventory is worth $30 to $60 a year in interest on the investment. Dust has no commercial value.

3. Accurate pricing of invoices to customers is a loss-saver when compared with memory or shuffling

this year FLY FLOATS

For sheer pleasure try floats this year. Reach remote fishing and hunting spots; cruise distant waterways. Land just about where you wish with your own plane on Edo floats. To see for yourself, why not visit your nearest seaplane operator and check out on floats?

EDO CORPORATION College Point, L. I., N. Y.



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through a stack of old invoices.

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Art on the Office Wall

QUESTION: My old lady and I have a farm near the Canadian border where the snow gets hip to hip-and-a-half high in winter and we have a Piper. The boys are grown and still live with us so Mama and I roll out the Piper and go south for the winter. We make some stops on the way. Mama's got cousins from here to yonder. These stops are the trouble. At one of them Mama stepped into the hangar office ahead of me and darn near knocked me down backing out. Seems the office walls were covered with pictures and calendars of young chicks posing with next to no clothes on. I'm broad-minded but Mama is just broad. So she makes me go in and look each stop over, so she won't be insulted by those pictures. I think she's just envious but it's serious when she skips a trip to Cousin Emma's because of some operator's choice of wall art. It's got so I'm uneasy every time I land Mama at a strange airport. Can she be right?

ANSWER: Mister, we'd just as soon you hadn't asked us. But the Boss says a subscriber is a subscriber and must be served to the best of our ability, especially if he's in real trouble. Now we don't know the answer but what we think is as follows:

Display of the female figger, real or imagined, is a part of everyday life for those who have eyes and can see when they look at the public prints, pass sign boards, go to the movies, watch television, go swimming or just stroll along a street. But we took the problem to an old-timer who operates a mighty good airport and talked it over with him. So we're passing along his views. He says, and we quote:

"Look around my office and you'll see I have two of those calendars, one behind my desk so the customer can find the date when writing me a check and the other on the far wall so I can tell how long I can wait before paying my bills.

"There's none out in the lounge. A lady can sit out there all day without being offended by anything but the smell of somebody's sweat or the sound of some guy bragging about his flying.

"We don't seem to get enough women around here any more to worry us. Used to be we had some gal students and a couple of women owned airplanes here in town. I don't think it was girls in bathing suits which drove them away. I'll admit if I had them plastered all over the walls including the lounge it might be bad. But only because it would make people think I had women on my mind instead of money and Mister, I like the shape and feel of a ten-dollar bill

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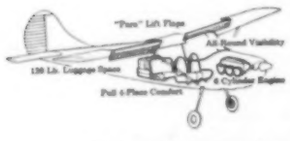

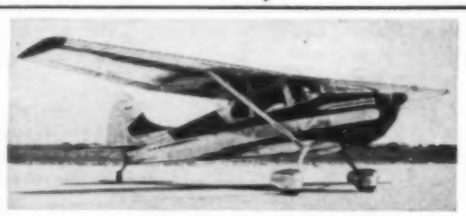

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a sight more'n them synthetic figgers.

"Actually, they don't bear much resemblance to any gal I ever knew. Look more like preliminary sketches of a model not yet in the prototype stage. Now I remember a little Cajun gal in New Orleans that I thought was tops but she couldn't measure up to one of these calendar cuties. Just look at those legs and — well, anyway, a man has to find the day of the month somewhere and a picture of a propeller or an autopilot doesn't draw the eye as quickly as a calendar come-hither.

"I don't hold for any display that is immoral or in bad taste.

"As for youngsters, I see no effect, either. However, a boy came in here once with his father and pointed out one of my calendars, wanting his daddy to tell him what it was. The old man told him it was a woman. The kid looked back at the calendar and says, 'Then, what's Mama?' "

That's what our airport friend thought about your question. So we can opine only that Mama — your wife — is right by her own lights and the artists and purveyors of calendar pictures are right by theirs, or they wouldn't be faced with the public demand which seems to continue each year. ★ ★ ★

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